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ABSTRACT

This 2000 Association of Small Computer Users in Education (ASCUE) conference proceedings first highlights keynote speakers and describes the pre-conference workshops. The conference papers and abstracts that follow discuss: strategic planning for faculty, staff, and student development; a network lab; the Blackboard course delivery system; Web-based, self-paced computer laboratory instruction; reorganizing information technology (IT) for the future; a centralized campus calendar; Web-based discussion board; Web-enhanced compressed video education curriculum; conceptual model for distance education delivery; Macromedia Flash 4 for interactive graphics and animations on the Web; a hypothetical decimal computer; restructuring a Civilization and Culture course; helping students design programs; intelligent agent tutors; gaps in the campus community that technology can help bridge; Web-based system for introductory mathematics; deploying a video streaming application on the Web; technology in the undergraduate curriculum; CROW Project: directing faculty to course-specific Web-based teaching resources; student staffing of an Academic Learning Center; Microsoft Publisher 2000; Microsoft FrontPage 2000; state mandated education standards on technology; E-commerce; role of industry certifications in colleges; building a pre-class community; Web use for engaging students in computer science classes; strategies for supporting faculty use of technology in teaching; using active server pages and a SQL server database to create a class scheduling system; computer use for recording student scores and assigning grades; faculty and staff training for the new Millennium; student evaluations of condensed format computer courses; real time integration of the Web with student-based information systems; integrating an event calendar into the campus Web site; the Special Education Online Institute; and an information technology handbook. Includes a presenter's index. (AEF)

ASCUE

ASSOCIATION OF SMALL COMPUTER USERS IN EDUCATION

"Continuing Second Quarter Century of Service"

Proceedings of the 2000 ASCUE Summer Conference

33nd Annual Conference

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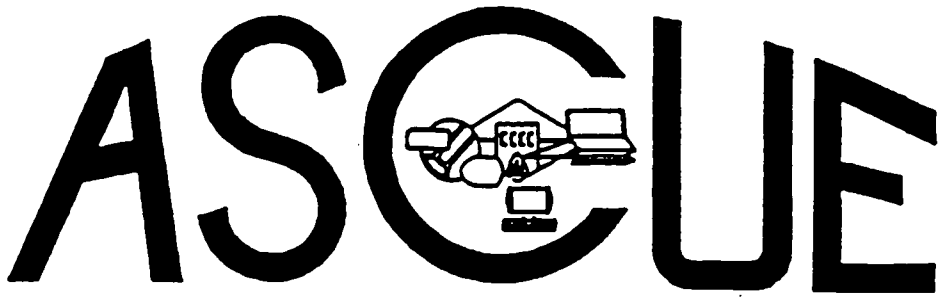
North Myrtle Beach, South Carolina

Edited by Peter Smith, Saint Mary's College



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Myrtle Beach, South Carolina
Web: http://www.gettysburg.edu/ascue

ABOUT ASCUE

ASCUE, the Association of Small Computer Users in Education, is a group of people interested in small college computing issues. It is a blend of people from all over the country who use computers in their teaching, academic support, and administrative support functions. Begun in 1968 as CUETUG, The College and University Eleven Thirty User's Group, with an initial membership requirement of sharing at least one piece of software each year with other members, ASCUE has a strong tradition of bringing its members together to pool their resources to help each other. It no longer requires its members to share homegrown softwatre, nor does it have ties to a particular hardware platform. However, ASCUE continues the tradition of sharing through its national conference held every year in June, its conference proceedings, and its newsletter. ASCUE proudly affirms this tradition in its motto "Continuing Second Quarter Century of Service."

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NEED MORE INFORMATION?

Direct questions about the contents of the 2000 Conference to Carol Smith, Program Chair, ASCUE '00, Coordinator of User Services and FITS Center Manager and Support Specialist, Depauw University, Greencastle, IN 46135, 765-658-4287, clsmith@depauw.edu. Web: http://www.gettysburg.edu/ascue

Association of Small Computer Users in Education

ASCUE 1998-1999 Board Members

(years remaining in office including current year)

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Keynote Speakers

Diana Stielstra was waiting for her committee at Indiana University to review her Ph.D. dissertation in medieval literature when she took a contract proofreading job for a small company called Microsoft in 1982. She completed her Ph.D., but never returned to college teaching. After working as a freelance technical writer for Aldus and US West Network Systems, she began full time at Microsoft in 1992, working on the editorial team that designed the Microsoft Developer Network (MSDN). She currently designs and writes on-line Help for the Internet communications products MSN Messenger Service and Hotmail. Although her career took a different path, her interest in education and communicating ideas has never changed, and her ties to the educational community are strong.

Diane will give the first keynote address on Monday morning. Her topic is "Computing and Liberal Arts: Oil and Water?"

Bob Longo has held positions of increasing responsibility at a variety of high-technology companies over the past twenty years. Prior to taking the leadership role at Carnegie Learning, he helped launch REVIVE Technologies, Inc., and was a member of its founding investment and management group. Before that, he was president and chief operating officer of Surefind Information, Inc., an Internet enterprise. Bob also spent more than ten years in key management positions with Apple Computer and NeXT Software, formerly NeXT Computer, Inc. Before entering the business world, Bob spent five years as an educator and consultant with full-time and adjunct teaching appointments at the university and secondary-education levels.

Bob will give the second keynote address, "The Challenge & Complexity of Integrating Technology, Curriculum & Pedagogy," on Tuesday morning.

Pre-conference Workshops

Pre-conference Workshop 1
Developing Streaming Media for Web Delivery
Presented by: David Adams, Professor of Information Technology; Kevin Floyd, Web Information Specialist; Timothy Vick, Assistant Director of Information Technology
Macon State College

This one-day workshop will focus on the desktop technologies for capturing, digitizing, and editing audio and video files, the techniques for producing streamable formats, and the mechanisms for delivering digital media through Web pages. The purpose of the workshop is to provide participants with hands-on experience with these technologies, demonstrating the relative ease and viability of producing Web-deliverable digital materials using common desktop and server capabilities. The focus is not on the educational implications of the techniques but only on their application.

The only prerequisite know-how is familiarity with desktop PCs and simple Web page authoring skills. Template pages will be developed to keep authoring requirements at a minimum. The expected outcome of the workshop is that participants will be enthusiastic about and encouraged to return to their home institutions to continue exploring digital media production and delivery.

Participants should leave with the understanding that developing streaming media for Web delivery is within their individual capabilities and within a technological cost and capabilities framework that makes it highly viable.

About the Presenters: David Adams is a Peyton Anderson Endowed Chair of Information Technology at Macon State College. His academic specialties are in Web technology, including development of instructional and e-commerce sites and delivery of multimedia content. He has authored nine books on various topics in information systems, co-authored the first set of national curriculum guidelines in computer information systems, and helped set up undergraduate and graduate programs at three institutions.

Kevin Floyd is Web Information Specialist in the Office of the Vice-President for Academic Affairs at Macon State College. He has A.S. degrees in Mathematics and Education and a B.S. degree in Information Technology from Macon State. His academic specialties are in computer ethics, educational technology and Web technology, including development of instructional web sites and web page development training. He is a member of the Association of Information Technology Professionals.

Tim Vick is a 2000 graduate of Macon State College. He is an Information Technology major specializing in multimedia development and educational technology. He has helped develop several streaming video presentations for delivery both as computer-based and web-based training.

Pre-Conference Workshop 2
Blackboard: Post Your Course on the Web, Free -- Today
Presented By: Stephen T. Anderson, Sr., Associate Professor
University of South Carolina Sumter

Blackboard™ is a product that many schools are purchasing to facilitate a faculty member in posting their course on the web without being an HTML expert. The "template style" of Blackboard allows a person with no HTML knowledge to create a site with LOTS of power, interactivity and flexibility... or a simpler site that is mainly informative. It can include all the basic syllabus and schedule information, an announcement board, a calendar, an area for the posting of course documents, complete email support, discussion group support, virtual chatting, and an area for external links to allow "virtual field trips" to other web sites. It includes a test generator and a grade book (where they can check THEIR grades only). It also allows students to check grades, post their own home pages, edit their own profiles, and drop files to their professor into a "digital drop box."

This seminar will allow attendees to ACTUALLY CREATE such a course. We will actually begin to post a course on the blackboard.com server for free to give it a test drive (5 MB of space remains free, but it must be "hit" every thirty days or it is purged. A site is only $100 per semester for 10 MB + tech support) While we will not have time to explore ALL of its power, we will have the time to actually use many of its features in order to whet your cyber-appetite. You will create a site that you may add materials to when you return home. If you have been waiting for the right time to web-enhance your traditional course, or go entirely "on-line", this workshop is for you.

About the Presenter: Steve Anderson has been heavily involved in multimedia since 1992, after attending an ASCUE workshop. He has presented many papers at ASCUE and HENA which emphasize multimedia as a tool for teaching/learning as well as for presentation purposes.

Pre-conference Workshop 3

Make a Splash with Flash: Learn the Basics of Macromedia Flash 4

Presented by: Janet Hurn, Miami University Middletown
Cheryl Reindl-Johnson, Wilmington College
Nancy Thibeault, Sinclair Community College

In this workshop, you will learn the basics of Macromedia Flash 4, a powerful set of tools for creating clear, fast, efficient, interactive graphics and animations for use on the Web. We will show you how you can add sophisticated multimedia effects to your Webs without having to learn complicated scripting.

The workshop will include:

- Tour the Flash interface
- Using Flash drawing tools to create images
- Create frame by frame animations
- Use the timeline to animate images
- Create a rollover button with changing graphics and sound
- Create a movie clip
- Design a Flash interface to a website that uses sound, animation and movies
- Interface Flash with HTML

About the Presenters: Janet Hurn is is a Physics Instructor and Co-Coordinator of the Faculty Summer Institute on Teaching with Technology at Miami University. She has also been co-cordinator of the annual technology fair and chair of the Retention Committee at the college. Her special area of interest is multimedia in Physics education.

Nancy Thibault is the Computer Services Manager at Sinclair Community College and the other Co-Coordinator of the Faculty Summer Institute on Teaching with Technology and annual technology fair at Miami University. Her special area of interest is Web/Database programming.

Cheryl Reindl-Johnson is the Evening College Coordinator for Wilmington College, a 4-year liberal arts institution in Wilmington, OH. She has worked in higher education for the past 14 years, and been involved in distance education and computer technology for the past 6 years. She earned her B.A. in International Business and Communication from Wilmington College in 1989, and her M.A. in Rhetoric and Composition from Miami University in 1993.

Strategic planning for Faculty, Staff, and Student Development

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Abstract:

For the last couple of decades, communication technology, especially digital systems, have been taking a major place in educational institutions. This shift created an unprecedented need for training of faculty, staff, and students. It is not only a matter of teaching the mastery of a machine and its numerous software applications, but mostly, it is a matter of changing attitudes towards the machine as a digital processor of several applications. Most importantly, it is a matter of changing attitudes toward the very notion of learning and knowledge. In this presentation, we will share with you our experience at Francis Marion University, including our strategies we have adopted to facilitate interaction with the members of our community and lead them to feel at home with their machines as they learn more and more every day.

Overview

The growth of technology's influence on all disciplines (classic, modern, humanities, science, etc.) is so fast and so broad that its eventual effects are quite literally unimaginable. This means that an enterprise primarily concerned with training and organization is constantly challenged. Running an office of Instructional technology is somewhat like been the captain of a great ship, a ship that is ever accelerating and whose cargo is always increasing. There needs to be strategic planners who are analogous to both pilot and navigator. The pilots information can require an almost an immediate response (this approach is the tactical). The navigator's information requires a carefully calculated and often relatively large response that affects direction profoundly.

The purpose of Instructional Technology as a discipline is leadership of the academic community towards an understanding of technology as "more than the sum of its parts. It is a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a

combination of human and non-human resources to bring about more effective instruction."[1] That is, the discipline of Instructional Technology has as its mission to coordination and facilitation of meaningful access to human and non-human resources of discipline, departments and agencies. Members of the academic community need to be actively involved in the elaboration of various methods of instruction in combination with appropriate media and technology. The initiatives of faculty, staff, and students are considered seminal to the task of learning and instruction. One of the most useful investments in IT, other than urgent investments in equipment and training, would be in the mechanisms and personnel of strategic planning.

Strategy

Strategic planning for the development of faculty, staff, and students requires two conditions above all else. These are: clear and simple goals accompanied by unambiguous and measurable outcomes. The Office of Instructional Technology at Francis Marion University employs the following goals and outcomes:

Goal A

Implement advanced technologies of communication in the every day life of the academic community and serve as a resource center for the support of scholarly pursuits by faculty and students.

Outcome 1: Keyboarding and word processing

Faculty, Staff and students should develop competency in using microcomputers for the writing of their papers and correspondence.

Outcome 2: Electronic Mail

Faculty, staff and students are encouraged to develop competency in using E-Mail for their every day lives, including the most common applications.

Outcome 3: Networking

Faculty, staff and students are encouraged to develop competency in browsing through the resources on Internet, including the ability to search, select, and save or download relevant information.

Outcome 4: Audio & Video Recording and Editing

Faculty, staff and students are encouraged to develop competency in the collection and the composition of audio-visual data, including the ability to originate, design, and carry out the production of a show, a report, or simply collect data.

[1] Source: A Report to the President and the Congress of the United States by the Commission on Instructional Technology. Sterling M. McMurrin, Chairman, 1970.

Goal B

Provide members of the academic community with the opportunity to reexamine their instructional strategies and presentation skills.

Outcome: Microcomputers and Various Media in Research and Instruction.

Faculty are encouraged to develop competency in using effectively the various electronic media in their instruction and research, including the integration of microcomputers in the classroom and the utilization of software packages relevant to their disciplines, and the available digital material.

Goal C

Implement innovative strategies in learning and instruction to promote academic development and intellectual stimulation.

Outcome: Authoring electronic presentations for classroom and distance instruction.

Faculty are encouraged to develop competency in authoring classroom presentations for classroom instruction, including the utilization of one or more presentation packages. Interested faculty members should be able to integrate text, clipArt, Imported images, video and sound to create computer controlled audio-visual displays or multimedia presentations

Faculty are also encouraged to develop competency in distance instruction, including the World Wide Web and Vtel system integrating various media and challenging methods of instruction.

Goal D

Serve as a catalyst for the implementation of various media of communication in the design and the development of innovative methods of instruction.

Outcome: Authoring Electronic Publications

Faculty are encouraged to expand their competency in the development of interactive media for their disciplines. The Office of Instructional Technology will provide training in at least one or more multimedia packages.

Faculty are also encouraged to acquire competency in the design of electronic publications, involving the manipulation of text, graphics, photographs, video, and sound. Through the Office of Instructional Technology, faculty should be able to develop applications for distribution through Internet, CD/ROM's, videodisks, or other computer-based formats.

Implementation

Strategic implementation for the development of faculty, staff, and students requires two conditions above all else. These are: strict adherence to well researched principles of human learning and unqualified priority support of initiatives by faculty, staff, and students ("ask and it shall be given"). The Office of Instructional Technology at Francis Marion University pursues the efficient and thorough development of the following priority competencies as targets of opportunity (needs) arise. This usually entails:

- Word-processing/desktop publishing, E-Mail, Networking, and Audio/Video Recording.
- Integrating Microcomputers and advanced media in Instruction.
- Authoring Electronic Presentations for Classroom and Distance Instruction, WWW development.
- Authoring Electronic Publications on CD, laser disk, and other formats.

This commonly requires the following activities:

Activity 1: Workshops

The Office of Instructional Technology provides the academic community with several workshops aiming to inform faculty, staff, and students about the potential of the various media of communication and instruction, and foster their competency.

The Office of Instructional Technology offers several workshops aiming at faculty and staff development. At this moment, the Office is considering the following workshops:

Activity 2: Individual Conferences

The Office of Instructional Technology provides faculty and staff, with individual conferences in various technologies of instruction. Individual conferences aim at addressing specific obstacles that the academic community members may encounter in their development.

Activity 3: Quick User's Guides & Tutorials

The Office of Instructional Technology produces Quick User's Guides and tutorials to serve faculty, staff, and students for reference during workshops and their practice of specific application programs. Tutorials and Quick User's Guides are also intended for individuals who choose to learn by themselves and at their own pace.

Activity 4: Consultations

The Office of Instructional Technology provides the academic community with the option to call in for consultation on various questions regarding the design, the development, and the applications of

instructional systems. This may include the numerous applications of the analog and computer based formats.

Activity 5: Instructional Samples

The Office of Instructional Technology provides faculty and staff with instructional samples aiming to guide them in the design and the development of advanced media of instruction. This is also an opportunity to bring together the academic community to share their knowledge and experiences working with multimedia for both instruction/presentation and research.

Assessment

The Office of Instructional Technology relies on four measures to assess the effectiveness of its programs:

The Nature of Measure 1: Immediate evaluations of individual activities

> After each workshop, the Coordinator of Instructional Technology administers an evaluation of the session including the competence of the instructor and the effectiveness of the performed activities. The attendees are asked to rate the instructor's performance on a scale from 1 to 5 (1= Excellent, 2= Good, 3= Fair, 4= Poor, 5=Cannot Rate).

An Example of Measure 1: Immediate evaluations of individual activities

During Spring of 1997, the Office of Instructional Technology offered 15 workshops in Windows, MS Word, MS PowerPoint, Photoshop, Netscape, and Video Production. These activities were attended by over 200 members of faculty, staff, and students. For some of the activities, evaluation forms were distributed (approx. 83) and 78 evaluations (about 95%) were returned with the following results[2]:

	Excellent	Good	Fair	Poor	Cannot Rate
Instructor's ability to present and explain material in a clear and understandable manner was:	23 33%	36 52%	8 11%	1 1%	
Instructor's ability to stimulate interest in the subject was:	22 34%	32 50%	8 12%	1 1%	1 1%
Instructor's ability to improve understanding of the subject was:	21 32%	35 53%	7 10%	2 3%	
Accessibility of instructor was:	33 50%	24 36%	2 3%	1 1%	5 7%

[2] Note: Given that attendees didn't answer all the questions, rows don't sum to 78.

Instructor's knowledge of the subject was:	40	61%	22	33%					3	4%
Instructor's ability to encourage critical thinking was:	21	33%	26	41%	6	9%	2	3%	8	12%
Relevance of assignments:	15	25%	24	38%	5	7%	2	3%	17	26%
Overall, instructor's classroom performance was:	25	39%	33	52%	3	4%	2	3%		
Overall quality of this workshop was:	24	36%	32	48%	8	12%	2	3%		

The Nature of Measure 2: Log of Activities and Progress Reports

After each activity, the Coordinator of Instructional Technology reports on the progress of individual faculty members to a Consulting Log. Each activity is rated from 1 to 4 according to the four stages of the implementation of advanced technologies in instruction. The level of attainment of the faculty or staff member is also rated from 1 to 10 (1= novice, 10= Advanced).

An Example of Measure 2: Log of Activities And Progress Reports

During Spring of 1997, the Office of Instructional Technology offered several consultations and individual conferences for faculty, staff, and students. The following is a summary of the services rendered to individual departments:

Department	Total Consultations	Mean Time	Project Attainment Type	Level
Chemistry, Physics, and Mathematics	1	1	3	6
Business	6	1	3	4
Psychology & Sociology	7	11	3	5
English, Modern Languages and Philosophy	22	1	3	4
Political Science, History and Geography	8	1	2	3
Nursing	2	1	3	3
Fine Arts and Mass Com.	2	1	3	3

Education	8	1	2	2
Biology	1	1	3	3
Library	3	1	3	3

The Nature of Measure 3: Suggestion Folder

The Office of Instructional Technology welcomes suggestions from Faculty, Staff, and Students. A special attention is paid to ideas aiming at improving the services of the office in terms of its initiatives, activities, and accomplishments.

An Example of Measure 3: Suggestion Folder

During Spring of 1997, the Office of Instructional Technology received several written and oral suggestions from faculty, staff, and students:

- Need for digital presentation facilities in Founders Hall
- Need for portable presentation facilities for off campus activities
- Need for a scanner for students and faculty use
- Need for workshops for Mac users
- Need for a document visualiser in Founders Hall

All the requests were discussed with the Director of Academic Computing Services and the Director of Media Center. To respond to this need, next year's budget will include the following:

- Two mobile digital presentation facilities to be placed in Founders Hall.
- Two portable computers and projector to be placed in the Office of Instructional Technology.
- A scanner will be placed in the Office of Instructional Technology.
- The Office of Instructional Technology will plan several workshops for Mac users.
- A document visualiser, which is currently in the Office of Instructional Technology will be moved to Founders Hall.

The Nature of Measure 4: Annual assessment of the needs of individuals, groups, and departments, and the effectiveness of the office in meeting those needs.

This measure, as opposed to our various formative measures is intended as a summative review by each client entity, in which each develops a prioritized projection of need and acceptable alternate responses to need. These are then integrated in a strategic master plan.

An Example of Measure 4: Annual assessment of the needs of individuals, groups, and departments, and the effectiveness of the office in meeting those needs.

Regrettably a non-theoretical example of this is unavailable at this time. Our process is in development. A thoroughly coordinated consensus is our much desired goal. An intermediate

instrument of some utility is the FMU On-Campus Activity Evaluation Form, as currently modified by the Office of Instructional Technologies. (Copies available on request.)

Tentative Directions For Long Term Improvement

1. The Immediate Evaluations of Individual Activities should be extended to encompass the following questions:

- How prepared are you now for this technology?
- How well did the workshop address your needs?

2. The Office of Instructional Technology should increase the number of workshops and seminars for presentation and multimedia development.

3. The Office of Instructional Technology should make the Suggestion Folder easily and continuously accessible to faculty, staff, and students and develop a systematic strategy to gather, organize, and study its data:

- The Suggestion Folder should be established at the door of the Office of Instructional Technology.
- After each training activity, the IT Coordinator should mention the availability of the Suggestion Folder.
- At the end of each semester the IT Coordinator should formally solicit suggestions from faculty and staff.
- At regular intervals, perhaps once a month, the IT Coordinator should thoroughly all materials in the Suggestion Folder and, to the degree feasible assign priorities.
- Improvement decision will be coordinated with other instructional support services and, when relevant, individual departments.

Summative Commentary

Instructional Technology is like a giant child, our potentials for both achievements and waste are enormous. The critical variable directing these realizations is planning, not just tactical planning, although that's also urgent, but long term strategic planning constantly refined and refocused in response to a never-ending stream of pertinent feedback information and specific valid assessments.

These requirements reflect the special position of Instructional Technology in the evolution of academic support services. That evolution can be summarized in an oversimplified and apocryphal history that, for all its limitations, still portrays the derivative relationships of the service disciplines. First there were libraries that did well the things that libraries do. However, with the development of powerful analog resources (film, audio, video, etc.), a significant number of librarians resisted what would have been a change and extension of their traditional role.

Consequently media centers developed Media Centers flourished and provided excellent support in their area of competence. Soon, computers appeared on the scene (usually in Math Departments or the new departments of computer Science) and almost immediately pressure developed to support for the information processing needs of faculty and students. Efforts were made, but with the development of microcomputers and their broad availability, this demand became enormous. It might have been expected that departmental expansions and media centers would adjust to meet this new need. But like the librarians before them, they really did not desire this responsibility. Academic Computer Centers began to appear and proliferate and effectively met this new need. However, in time, the number and variety of immediately useful applications multiplied at an extraordinary rate. The options and utilities of microcomputers and peripherals followed at almost the same rate. An enormous new clientele appeared almost overnight. Their urgent needs concerned mastery of microcomputer applications relevant to their disciplines, especially multimedia and hypermedia. This extension was well beyond the mission of already over-extended academic computer centers. Consequently, the new discipline of Instructional Technology began to develop focusing on training in and organization of the vast and ever expanding array of new applications. Development and technology is moving so fast that instructional technology is routinely exposed to heroic challenges.

Pulling Together a Network Lab

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Introduction

The Information Technology (IT) industry is growing very fast: 346,000 positions are open in the US with an annual projected growth of 175,000 to 250,000 workers (Microsoft, 1998). The positions most in demand are technical support representatives, database developers, network administrators, programmers, and web/e-commerce developers. Higher Education has a tremendous opportunity to provide credit instruction and non-credit instruction/training in these areas.

One of the challenges of instruction in these technical areas is providing hands-on experience to students without disrupting the rest of the campus. Computer facilities on a campus are usually limited (as are funds, which will be discussed again); thus, you must balance the needs of the application-oriented computer classes (which must have operable hardware and software) against the hardware, operating system, and networking classes (who must be able to tear down, repair, install software, and set up networking). These two divergent types of IT instruction usually do not mix well; computer application instructors and students are not happy (and rightfully so) when the computers do not operate or the software does not work because the previous networking class just tried out FDISK.

This paper will explore the setup of a separate "network lab" where hands-on instruction in hardware, operating systems, and networking topics can take place without disrupting the rest of the campus.

Objectives of a Network Lab

There are a number of objectives that a network lab could achieve depending on your organization's needs and motivation. This could also evolve as time passes. At Pitt-Titusville, our current goals for the network lab are:

1. Provide equipment and instructional space for students to learn and practice hardware maintenance fundamentals.

2. Provide equipment and instructional space for students to learn and gain hands-on experience with networking fundamentals and network operating system software installation, setup, and maintenance.

3. Provide equipment and instructional space for testing of new software and hardware before installing it in the campus environment.

This paper will focus on the second goal, but the lab setup described is used to support the other two goals as well at Pitt-Titusville.

Equipment Required

The table below summarizes the type of equipment needed to instruct network classes; the number of items needed depends on the number of workstations in the lab. Currently our lab has 12 workstations; class size is limited by that factor. However, small classes allow for a better learning environment for students.

Note that the specifications below are more than what Microsoft documentation indicates is needed to load their NT Server or Workstation operating systems. The specifications stated are more realistic in a real world environment.

Item	Specifications
PC's	100 MHz minimum, Pentium class, 32 MB RAM minimum, CD-ROM, 1 GB hard drive minimum
NIC Cards	10/100, possibly combo cards, variety of manufacturers
CAT 5 (10BaseT) Cable	500 Foot Reel
RJ 45 Connectors	100 +
Thin Net Coax Cable	For show and tell; enough to connect several machines
BNC T-connectors and terminators	For show and tell
Cable making kit	Crimp Tool/Die for RJ-45 or BNC Connectors
Cable Testing Equipment	May range from inexpensive to expensive
Hub	16 port minimum
Printer(s)	Laser preferred; multiple printers provide good training
Tables	Keyboard trays are helpful
Chairs	
Storage cabinets	Storage for software, spare parts
Projection screen	
Whiteboard/Smart board	
LCD or other projector	
Scanner	Optional
Tape Backup	Compatible with network operating system; optional
Server Class PC	Used to demo volumes, disk redundancy, etc.; optional
Modem(s)	Necessary to demo RAS; optional
MAC Client	Used to demonstrate interconnectivity; optional
Tools or tool kits	Students may be required to purchase their own
Spare parts	RAM, disk drives, cables, etc.

The Moneyless Pit - Obtaining Equipment

Money is, and always will be, an issue, whether at a public or private higher educational institution, or any other organization for that matter. Grants may be available, assuming that someone at the organization has the time and abilities to pursue them.

Equipment that has been replaced in other classroom or public lab facilities may be available. While not state of the art, slightly outdated hardware does suffice and at times, more realistically portrays the real world environment. Anything greater than 100 MHz Pentium processors will work with the operating systems and network operating systems used to instruct networking topics. RAM and hard disk(s) can be upgraded if necessary to make the equipment more usable.

Equipment may also be acquired or donated from various businesses in your community. Obtaining and upgrading equipment is a continuing challenge; we are always on the lookout, scavenging for equipment we can use in the lab or for show and tell to illustrate different types of NIC cards, different cables (thin net, 10BaseT, fiber), hard drives, etc.

Students may be dismayed that the equipment is not brand new; however, the instructor should remind them that having a variety of PC's in the lab (Dell, Gateway, Compaq, etc) provides a more "real world" experience for them. Students are provided the opportunity to make a variety of hardware vendors' equipment work together. Finding software drivers to make all of the hardware components work is also a challenge that students can experience first-hand.

Obtaining Software – Operating Systems

If your organization has a licensing agreement with Microsoft or Novell, then you may be able to piggyback on this. If not, Microsoft has an Authorized Academic Training Program (AATP) to help academic institutions provide training to students. The following statement is from the Microsoft's AATP Web Site:

> "AATPs receive a 100-user product license for each course taught on a Microsoft product per academic term (using Microsoft Official Curriculum or Microsoft Approved Study Guides). They must be active AATPs. Please note that the 100-user training-use-only software license does not include Microsoft Office User Specialist courses. The following desktop applications are not included: Microsoft Office, Word, Excel, PowerPoint, Access, FrontPage, Outlook, and Publisher. Note: Licenses are for student and instructor use in the classroom only. To use the license, an AATP must legally acquire one copy of the corresponding Microsoft product and then may install up to 100 copies of the product onto the hard disks of their institution's computers that will be used to deliver the training. Please see the AATP legal agreement for terms and conditions."

More details about applying for AATP status can be obtained at Microsoft's web site - http://www.microsoft.com/AATP/. Novell offers a similar program for post-secondary institutions; you can find out more about their Novell Education Academic Partner (NEAP) Program at this web site: http://education.novell.com/.

Obtaining Software – Applications

If your organization already has a licensing agreement with software vendors, you will be able to have students practice installing applications (such as Office 2000) in the network lab. This is an important real-world experience; students need to practice the installation, setup, and testing of the application(s).

If you do not have additional software licenses available, some software applications are available in educational versions or under educational grants at a reasonable rate. Check out Corel WordPerfect Suite and/or Microsoft Developer Tools:

http://www.corel.com/academic/index.htm
http://www.academicoop.com/ProductInfo/specoffersdownlds.asp

Shareware on the web or trial versions may also be used. The file(s) can be downloaded from the web and shared; that way all students can access the downloaded file to install it on their system. We have accessed Web browser software (Netscape), Utilites (Disk Keeper, Inoculate), Network Operating System Service Packs, as well as software drivers for various types of hardware. Check out these web sites:

http://www.netscape.com/computing/download/index.html?cp=hom04p1
http://www.executive.com/execsoft.asp
http://www.ca.com/registration/

Wiring and Electrical Needs

The multitude of equipment in the networking lab requires additional outlets. Each machine might require 3 plugs (monitor, CPU, and speakers); if there are 12 workstations then a total of 36 plugs or 18 outlets would be required. Some of these electrical needs can be met with UPS power strips, but is better to have the proper wiring set-up. Surge suppression of some type should be purchased and used in the classroom to provide students with good power management techniques and ideas.

Network port(s) can be installed and activated. Again, CAT 5 technology is the most popular in the real world and provides a good learning experience. We let students prepare (as part of the instructional experience) and run the actual cables from the PC's to the ports and/or the hub.

Some method of restraining or constraining all of the cabling in the room should be set up, such as floor cable runs. This will prevent students and instructors from tripping over or becoming entangled in the many cables and wires.

Furniture

A variety of furniture can be used; we scavenged our tables from other areas that were getting new tables. If they do not have keyboard trays, tables that are high enough to accommodate purchased keyboard trays free up valuable table space.

Additional tables or cabinet countertops should be provided for students to use in tearing down and testing/repairing equipment for networking or hardware classes.

Cabinets are necessary to store spare parts, show and tell parts, tools, software CD's, diskettes, and manuals. At least some of the cabinet storage should be secured via a key/lock system.

Room Arrangement

It is useful to set up the room with two PC's per table; each table can then act as a domain when installing operating systems. Each machine at Pitt-Titusville acts as a tri-boot machine: Windows 98, NT Server, and NT Workstation are all loaded in separate partitions. The students at each table can work as a group in their domain; they can test out projects by each student's PC acting alternatively as Server and Workstation.

The instructor's workstation can be placed at the front or back of the room, although the front has worked better. The instructor's workstation is a domain in itself, and a tri-boot machine. It can be a server class machine that can be used to demonstrate some advanced concepts to the class.

The screen and whiteboard at the front of the room provide a backdrop for the projector and space for the instructor to write on.

Lighting

Using the projector and a computer for instructional purposes during class requires that the lights be dimable, or if they can only be turned off, additional track lighting may be used. We have not provided additional lamps at each workstation because of limited desktop space, although that is an option.

Other Teaching Aids

A variety of networking magazines and catalogs placed in the network lab provides students with reference material in completing some assignments or for entertainment while they are completing other homework assignments.

We also have a variety of hardware and software vendors' sales material available for students to review.

Cheap Labor: Using Students to Assist in setup

Much of the CAT 5 cabling, the installation of the network cards, the upgrading of RAM, etc., can be performed by students as part of the instructional experience. They are eager to learn and practice the skills they learn about in class.

Assignments can be made for students to check available and upgradeable RAM, price RAM, install RAM, etc. Similar assignments can be made for hard drives, CD-ROM's, etc. Students can make and test CAT 5 cables; they can also price out all components. Students can price out, install, and

test NIC cards. Fdisk or Slate can be performed on the PC's so that students get the chance to load the operating system and software drivers from the ground up.

Conclusion

Pulling together a network lab is not an easy or overnight process. It takes a coordinated effort to find the available space and acquire and set up the equipment. The Network Lab is a valuable tool that students appreciate. Pitt-Titusville has also had inquiries from local companies about using this facility to "test out" potential employees' skills in networking; we have not yet "rented out" the facility but may consider it in the future.

Blackboard. . . in an Hour or Less

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Abstract

Blackboard is a web-based course delivery system that can be used to enhance traditional instruction, providing tools that facilitate student-to-student-to-instructor communication (collaboration tools), assessment (quizzes/surveys), student status (grading, tracking), and document delivery (handouts, course documents). This panel discussion will tell three institutions' experiences in using Blackboard, including strategies, lessons learned, faculty experiences, training issues, and student evaluations. Additionally, a short demo of Blackboard will be presented.

(This session will be a demonstration rather than a paper presentation.)

Case Study in Web-based, Self-Paced Computer Laboratory Instruction

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Abstract

Freshmen at Carroll College (Waukesha, WI) are required to demonstrate a significant level of computer competency during their first semester of study. Necessary competencies included a broad understanding of computing in general, and a detailed understanding of local resources and procedures. For the 1999-2000 academic year, detailed information on all required computer skills was provided via locally created Web-based instruction modules. Online demonstration of proficiency was through comprehensive online testing associated with each module. The *Whiz Quiz* system, developed by Virginia Tech Intellectual Properties, was used to administer and manage test scores for approximately 350 students. Students were encouraged to approach the tests as "open book" which could be taken as many times as necessary to achieve the pass criterion. In-class tutorials were available during the first half of the semester on a drop-in basis. The results encouraged continuation of this teaching technique, but revealed weaknesses in both the self-paced approach and the testing method. Lessons learned include: (1) "Self-paced" instruction used over an entire semester should include intermediate milestones distributed across the time period; (2) Students must be fully informed of the rationale and motivation behind both the course itself and the methods used; (3) The course must include a variety of motivational aids, including the availability of student-instructor interaction, timely positive feedback, early identification of individuals having problems, and contingent rewards; and (4) Assessment approaches must be as invulnerable to cheating as possible.

Introduction

Carroll College is a small, private liberal arts institution located in Waukesha, Wisconsin. It is the oldest college in the State, and is strongly committed to the principles of liberal arts education. One expression of this commitment is a requirement that all students demonstrate basic proficiency in computing principles and practice prior to graduation. New students must meet this requirement during their First Year.

At the time the requirement was originally defined, the Computer Science Department managed computing on campus. Computer literacy was taught as a half-semester course taken by all freshmen in their first semester. In some years Computer Science staff taught this course, and in other years faculty taught it from various departments. Additionally, students were allowed the option of "testing out" of the course by passing a computer competency test.

Although the College has a strong commitment to computer literacy, early approaches to following through on the commitment were not completely successful. This was due partially to staffing and scheduling issues, and partially to the absence of a clear curriculum. Failure to provide students with the basic necessary information was reflected in a large number of students needing very basic computer help over the course of the school year. Students who had supposedly demonstrated basic proficiency sometimes could not tell whether they were using a Mac or a PC.

An additional issue faced by the College's commitment to computer literacy is the changing nature of computing itself. Many of the things students learn in their First Year might not be accurate or even relevant in their junior (or even sophomore!) year. It was clear that students, faculty and staff must be kept informed about significant changes in the College's computing systems.

The College decided that to address these issues effectively, the task of basic computing familiarization should shift from the Computer Science department to the College's Information Technology Services (ITS). This decision was based on two main lines of logic. First, ITS is where people on campus come to solve their computing problems. As such, ITS sees first-hand what type of computing knowledge is most beneficial to the average computer user on campus. Second, it seemed a better use of resources to have ITS staff rather than Computer Science faculty teaching this material.

The current school year marks the first in which the responsibility for teaching computer literacy has rested with IT staff. This paper is a brief description of how this was accomplished and what was learned as a result.

Decision-Making

Deciding how to approach computer-literacy instruction from within the IT department required both top-down and bottom-up types of analyses. From a higher-level perspective, we needed to make decisions about how instruction would be delivered, how students' work would be evaluated, and how the system would fit into the overall freshman curriculum. Additionally, we needed careful bottom-up analyses to define the specific set of competencies to be taught. Once these decisions were made we could move on to determining whether currently available instructional systems met our requirements, or if we would need to develop a more customized approach.

Web-based vs. Classroom Instruction. We chose a Web-based approach to computer literacy instruction based on two primary factors. First, it seems logical that using the computer is a good way to learn to use the computer. Some of the most basic and important information about computing on campus would be imparted simply by requiring students to use computers. Second, it was decided that we simply did not have enough faculty and staff resources to provide individualized or even small-group instruction for this material.

Web-based instruction could provide us with four additional advantages. First, off-campus students would have access to the materials as long as they had access to the Web. Second, freshmen could access the materials before arriving on campus, meaning that they might be able to take fuller advantage of computing resources on campus earlier in the semester. Third, Web-based instructional materials could easily be made available as a reference resource to anyone else on campus. Finally,

Web-based information could be maintained as a reference for updated information on hardware and software systems on campus.

We realized that some students might not respond well to a completely "self-taught" approach, so we decided to augment the Web-based instruction with drop-in tutorials during the first half of the semester. We scheduled five hour-long tutorials per week both during the day and evening, and encouraged students to attend if they were having problems.

Self-Paced vs. Time-Structured. Because of our own resource limitations, we decided to let students self-pace their involvement with the material over the course of the semester. Essentially, students were given a deadline by which all the material should be completed.

Student Evaluation. Again, our commitment to Web-based delivery of instruction led us logically to Web-based evaluation of student progress. We decided that we would provide online tests of proficiency that could be taken as many times as necessary to achieve a 95% correct performance level. Students would be able to access the evaluation instruments at their own pace and completely unsupervised.

Integration Into Freshman Curriculum. All freshmen at Carroll College participate in a semester-long course called the First Year Seminar (FYS). The course consists of 25 sections of 10-20 students taught by 25 different faculty members. Each instructor chooses material from their individual area of expertise as the subject matter for their section. The overall goal is to introduce students to the scholarly environment, and to help prepare them for success at the college level.

The FYS provides a convenient partitioning of the freshman class into small groups. Since computer literacy is also considered a requirement for success at the college level, it seemed logical to integrate the Web-based instruction into this course. Through discussions with the faculty, it was agreed that successful completion of the computer literacy component would count for 10% of the final grade in the FYS. There would be no "partial" credit available; either a student successfully completed the material or they did not.

If a student failed to complete the material, not only would they forfeit 10% (essentially a letter grade) in the seminar course, but they would still not have satisfied the College's requirement to demonstrate computer literacy. In this circumstance, students would be required to take an in-class basic computing course offered by the Computer Science Department.

It was thought that the FYS would also be the focal point for students' work on the computer literacy material. Instructors would be provided with weekly reports on individual students' progress with the material. It was also hoped that instructors in the seminars could help motivate some of the discipline students would require to employ the self-paced approach to the computer literacy material.

Custom or Off-the-Shelf? We examined a wide range of possible delivery solutions for our course materials. This included popular "courseware" such as WebCT and Blackboard, among others. Although many of these systems would have provided a solution for us, none were designed with our specific situation in mind. We didn't need a system that could be adopted for any Web-based course; we just needed support for one course. We decided to develop our own course materials.

Rather than develop our own testing system, however, we evaluated currently available off-the-shelf products. Since we wanted students to be able to take online tests multiple times, we needed a system that could generate tests from a database of test items each time a test was requested. We decided on WhizQuiz, a product developed by the Information Systems and Insect Studies (ISIS) at Virginia Tech. We found WhizQuiz to be a robust and easy-to-use solution to web-based testing. WhizQuiz collects test results and e-mails them to the designated system administrator in a format that is easily imported into most spreadsheet and database applications.

In Practice

The web-based instruction system that we developed is illustrated in Figure 1. From this main menu, users progressed through a series of seven (7) instruction modules on a variety of topics as illustrated. A typical module menu is illustrated in Figure 2.

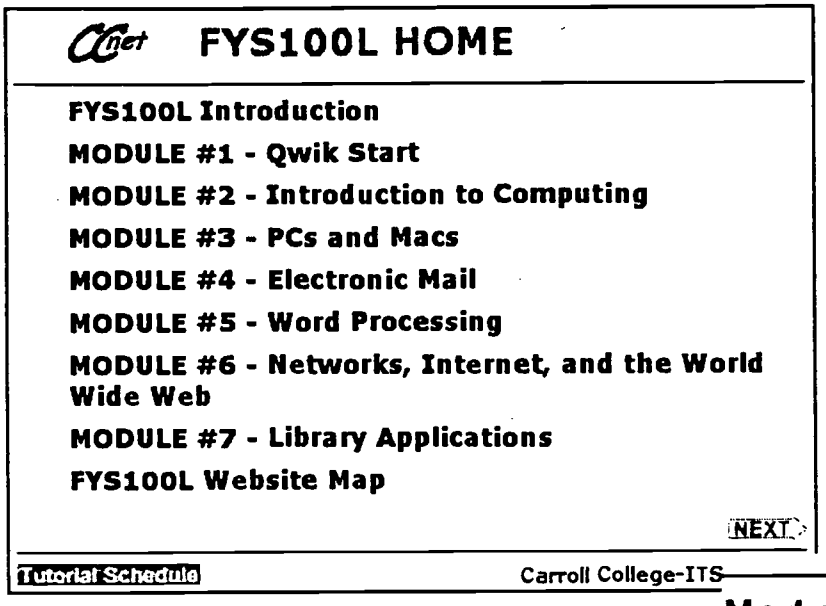


Figure 1.

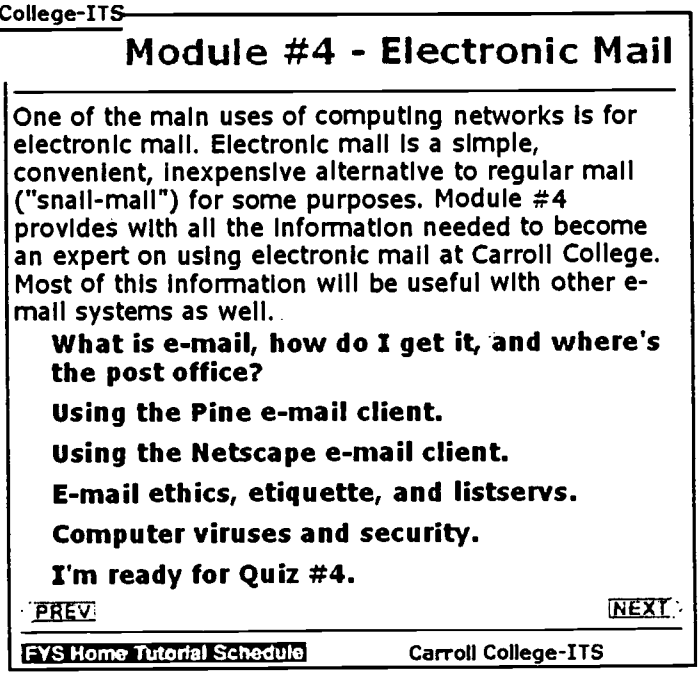
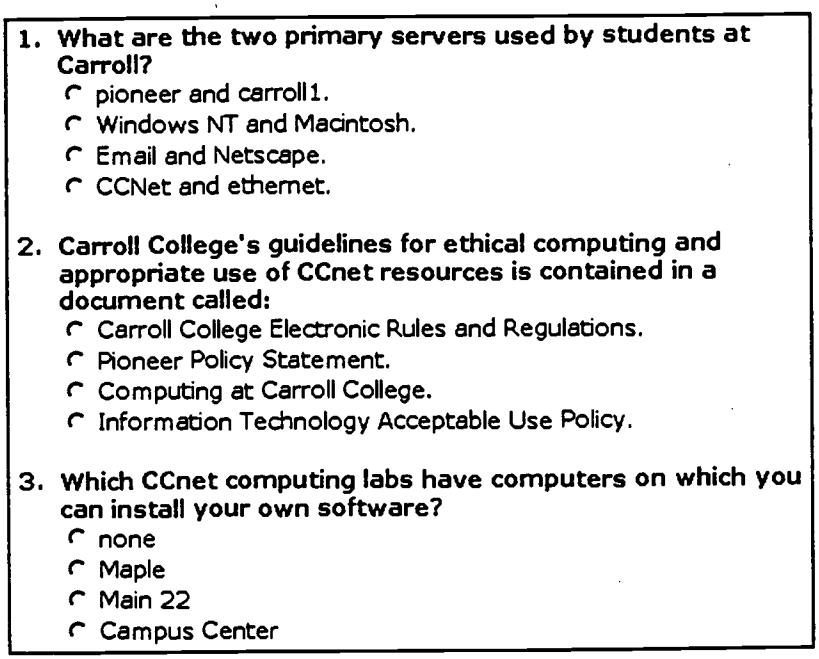


Figure 2.

The modules were designed to be somewhat interdependent, but students could choose to complete them in any order. The only exception was Module #1, which was to be completed first. This module contained the most basic information for computer use, such as turning the machines on and off.

Each module included a quiz consisting of between 15 and 30 true/false and multiple choice items. Students were encouraged to request a quiz prior to going through the module information, in order to obtain some perspective on what types of things were important in the material. Students could take each quiz as many times as necessary to obtain a 95% correct. Typical quiz items are illustrated in Figure 3.


1. **What are the two primary servers used by students at Carroll?**
   - pioneer and carroll1.
   - Windows NT and Macintosh.
   - Email and Netscape.
   - CCNet and ethernet.

2. **Carroll College's guidelines for ethical computing and appropriate use of CCnet resources is contained in a document called:**
   - Carroll College Electronic Rules and Regulations.
   - Pioneer Policy Statement.
   - Computing at Carroll College.
   - Information Technology Acceptable Use Policy.

3. **Which CCnet computing labs have computers on which you can install your own software?**
   - none
   - Maple
   - Main 22
   - Campus Center

Figure 3.

Students were required to provide four identifiers before they could obtain a quiz. These included username, password, FYS section number, and their student ID number. Upon submitting a quiz for grading, students received immediate feedback including the overall percent correct and a listing of whether their answer for each item was correct or incorrect. If a test score reached the 95% correct criterion, students were instructed to move to the next module.

Every time a student clicked on the SUBMIT button to submit a quiz for grading, WhizQuiz logged the test. Logged information included the student's login information, correct/incorrect for each item, the time, date and computer location (IP address). This information was collected in batches and then e-mailed to the computer literacy coordinator. It was imported into an Access database for easy reporting and querying.

In addition to the web-based information, walk-in tutorials were provided during the first seven weeks of the semester. The plan was to provide more individualized instruction on each module for those students who needed in-class help to complete the modules.

Approximately once per week during the semester, individual FYS instructors were provided with a summary of their section's progress on the computer literacy modules. This summary included each student and a list of the modules she or he had passed, if any. It was hoped that the FYS instructors would be able to help motivate students to work on the modules and answer questions as they arose.

System Performance. The custom Web pages integrated with the WhizQuiz testing system proved a very robust solution to our basic requirements. We were able to quickly identify and correct problems of both form and content. Thanks to WhizQuiz, we were also able to make changes easily to our test item database and overall test structure. For example, we identified a number of poorly worded test items that we were able to correct "on the fly."

At no time during the course of the semester was any part of the system unavailable to students, except during periods of server outage. Students using a wide variety of Web browsers, including Netscape Communicator, Internet Explorer, and AOL were able to access the information at almost any time from almost any location.

Curriculum Issues. The computer-literacy system was integrated into the First Year Seminar (FYS) as previously described. Effective application of the Web-based system, however, was impeded by a failure to effectively integrate individual FYS instructors (25 in all) into the overall process. This was mostly due to issues of timing, primarily the fact that work on the system did not actually begin until late June. As a result, the FYS instructors were not familiar with how the system worked or even how to gain access. Because of this, the advantages of working with the small, focused groups that make up the FYS were lost. For the most part, students did not view the computer literacy work as a part of their FYS experience.

How Students Approached the Tasks. Because the computer literacy modules were not effectively integrated into the FYS curriculum, students viewed themselves as essentially on their own. One result was a nearly universal tendency to wait until the very end of the semester to begin work on the modules. A few students attended tutorials during the first week of school, but mostly because they thought they were required to. Out of 339 students (some freshmen were exempt this year), none attended any tutorials after the first week of class. Even though FYS instructors were urged to encourage students to take advantage of this time, students were simply not working on the modules early in the semester. In retrospect it seems obvious that this would have been the case, but we did not anticipate this issue.

When students finally began looking at the modules, they were somewhat surprised to discover that the material would require real work to complete. Because of the way computer literacy had been handled in the past, students expected the modules to be very easy. It was common for a student to expect to be able to complete all the modules at one sitting. This is in contrast to our design concept, which called for completion of one module per week.

Due primarily to students' incorrect expectations about how much work the modules would require, the whole system began to be viewed in a negative light among students. The modules were seen as an onerous and excessive requirement. Although feedback from faculty was mostly positive, feedback from students was mostly negative.

Student Performance. In the end, 68.7% of the students (233/339)completed all the modules, receiving their 10% credit in the FYS class and meeting the College's computer literacy requirement. Many of these students completed the modules during the final two weeks of the semester. It was common for a student to make 4-6 attempts before passing a module quiz at the 95% correct level. 20.9% (71/339) of the students did not complete the seven modules.

Cheating. The largest and most serious problem we encountered was cheating. We knew in advance that we could not prevent students from using other's authentication information to take quizzes. We relied on students' honor in this regard. However, evidence of other, less-expected type of cheating began to appear near the end of the semester.

Our first clue was particular students' pattern of quiz taking. Analysis of quiz logs indicated that several students had been able to pass all seven modules in as little as 15 minutes, an almost physical impossibility. Additionally, some students' logs revealed 3-4 with a grade of zero (0) followed closely in time by a perfect quiz. A grade of zero could only result from submitting a blank quiz.

Additional analyses, combined with student interviews, indicated that students were using a variety of methods to cheat on the e-quizzes. Although correct-answer feedback was initially provided for each quiz, students were prohibited from simply using the "Back" button on their browser to go back and correct and resubmit a quiz. This was accomplished through Javascript embedded in the WhizQuiz pages.

However, we could not prevent students from opening multiple browser windows. Some students would submit a blank quiz in one window and then use the feedback to take the same quiz in another window. Even though the quizzes were never identical, they were similar enough that several attempts using this method were usually enough to pass a quiz. Additionally, we could not prevent students from printing out the answers to quiz questions and providing these to others. By the end of the semester there were several quiz "keys" available on campus.

Although there was evidence of fairly widespread cheating, only 39 of 339 or 11.5% of the students actually accused. These were students who we felt had almost certainly employed one or more shortcuts to complete the modules. They were all given opportunities to defend themselves, and the four who did were counted as having not cheated. The other 35 were treated exactly as any student who did not complete the modules. No disciplinary action was taken and no permanent records were made of those accused.

Lessons Learned

Coerce Early Participation. Students must begin work on the computer literacy modules as early as possible. In addition to making the on-line system available beginning in mid July, students will also be required to attend one-hour tutorials during each of the first three weeks of the semester. Students will incur a grading penalty if they fail to attend these three tutorials.

Students will also be required to complete the modules prior to the end of the semester. Half the modules must be completed in the month following the start of classes and the other half of the modules must be completed in the second month of the semester.

Better Integration into Curriculum. It is clear that the computer literacy requirement needs to be more effectively integrated into the overall freshman curriculum. Next year computer literacy will be taught as a "lab" section of the Freshman Year Seminar. As before, successful completion will count as 10% of the overall FYS grade. Next year, however, FYS faculty will be much more involved in every aspect of the computer literacy labs, including their planning and development and their ultimate implementation. We are already meeting with the appropriate faculty committees in order to ensure faculty involvement and awareness.

Clearer Specification of Expectations. Many students complained that they were unclear about the goals of the computer literacy system. Some students felt that too much information was covered, and some felt that they were already as "literate" as they needed to be. Next year, students will be given written information that clearly specifies what we expect them to learn and why we think it is important. This message will be reiterated in both the on-line system and individual FYS sections.

Clearer Specification of what is Considered Cheating. The topic of cheating was not discussed with students before our discovery of cheating on-line. We plan to make very clear what we consider obtaining an unfair advantage on the e-quizzes. Some students honestly did not feel what they did was cheating. In fact, some felt it was an expression of creativity! We will be as clear as possible about what is and is not allowed.

Proctored Evaluations. Although we remain committed to the goal of on-line evaluation, we plan to add a proctored final exam to the computer literacy modules. All the FYS sections will take this exam during the same week of the semester. It will be administered by the FYS instructors and scored by the computer literacy coordinator in the IT department.

Inclusion of Practical Exercises. Beginning next fall, the computer literacy system will include two practical exercises that must be completed and turned in to FYS instructors according to a specific schedule. Although we have not yet decided exactly what these will be, they will involve application of computer literacy information. They will be graded by IT personnel.

Conclusions

Taken as a whole, the system worked very well. We knew there would be bugs because of our short lead-time and the overall scope of the task we set out to accomplish. Even though many students did not approach the material with the best of intentions, passing the literacy modules did require them at least to be exposed to the basics of computing on campus. Current experience suggests this year's freshmen are less likely to contact the IT office with the same type of basic complaint we saw in the past. This is our best evidence that the system is working.

Reorganizing IT for the Future

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Introduction:

In the summer of 1999 the Computing Services department at Franklin College began a reorganization that has streamlined job functions, improved cross training, strengthened team interaction and collaborative problem solving, and in the process has also created a full time web administrator's position..

Process:

Several things happened to make it possible to do this

First of all, there was a need. Although there has been a rapidly increasing emphasis on the use of the web for internal communication, course development and recruitment, there was no one on campus who was responsible for the Franklin College web. The network administrator was spending almost half his time on web maintenance because somebody had to do it, and there was a Web Advisory Group overseeing development, but our efforts were haphazard and uneven, and nobody was happy with the web site. Still, although no one disputed the need for an improved web presence, it was clear that they did not fully understand the implications of ignoring it. In April the board decided to put the web master position on hold for another year and maybe longer. Computing Services decided that something had to be done.

Secondly, we felt we had the skills to do it. In 1996 the Leadership Program at Franklin College got a grant from the Lilly Endowment to change the campus culture from a "knowing" to a "learning" organization. Through participation in several pilot teams, cross-functional committees and workgroups, most of the Computing Services staff had been trained in collaborative problem solving and consensus decision making. There were trained facilitators available to work with any group that felt that this would help their process, and Computing Services had already used a facilitator to help develop a mission statement for the department.

In June we had a facilitated retreat to discuss job descriptions. Although there had been a consistent effort over the years to assign new tasks logically and to upgrade job descriptions in keeping with

reality, there was much history and personal preference evident in every position. The changes are very rapid in IT, and jobs must grow and change to meet new needs, but it often happens in a topsy-turvy fashion. So to start with a clean slate we listed all the IT tasks that are - or should be - performed by Computing Services, without regard to who claimed it at the moment. We then started the difficult task of grouping them logically. It was difficult because in reality it is not possible to separate tasks from the people who have performed them for a long time and have invested much of themselves in doing it well. There was not nearly enough time during the retreat to complete this, so we agreed to continue the process in weekly meetings.

By the time we had worked our way through it, everybody had given up something and gained something else, and every position had well designed, focused job responsibilities. In most cases people gave away what they did not want and got something they liked, and two people had completely new jobs. Everybody had a real sense of ownership – these were not changes imposed from above, they were negotiated within the group and accepted by everyone. By realigning jobs and tasks we had created a position for a full-time web administrator without adding a full-time employee, at the cost of increasing the part-time training coordinator from 20 to 30 hours per week and making better use of student workers. The administration approved the proposal, and implementation started in September.

Implementation

All these changes could not take place without extensive training for several members of the staff. The College had received a "Strengthening Institutions" grant from the Lilly Endowment to prepare for technological change. The focus of the grant was staff development, and it was therefore possible to make sure that everyone was properly prepared for their new assignments. We mapped out a 6-month transition period and evaluated training options.

It was obvious that on the job training would not be adequate. No sooner did we begin sending people to outside training than we were met with more challenges, as two key positions were vacated. Although at the time this appeared to be a problem, it gave us the opportunity to further fine-tune our reorganization process. No longer splitting network responsibilities between network infrastructure and OS support, we combined the two positions. Additionally, we placed all desktop software support and administration with the administrative software support person. Further, all desktop hardware support became one position.

The result of the reorganization is shown in the following chart:

Before	After
Network administrator	Web administrator
Hardware technician/network adm. support	Desktop hardware support
Administrative systems analyst	Administrative systems analyst
Administrative analyst/user support	Desktop software administrator
User application support	TLC support technician
TLC support technician	Network administrator
Secretary	Help-desk support/secretary
Training coordinator (20 hours)	Training coordinator (30 hours)

The five positions that had been targeted for training were Desktop software Administrator, Web Administrator, Network Administrator, Desktop Hardware Support, Help Desk Support person and the Technical Support person for our Teaching and Learning Center. Two of the positions (Network Administrator and Help Desk Support) required full training in these areas.

We agreed that the best option for the Network Administrator position would be to take Microsoft Certified System Engineer classes, while applying these newly acquired skills on the job. After seven 5-day classes over a six-month period, that training was completed. This training will also allow for the MCSE certification, which will add to Franklin College's credibility in this area. The Helpdesk Support person has taken advantage of various productivity software training classes to enable her to better answer questions and direct calls. Additionally, our Web Administrator has taken advantage of in-class and self-study courses and certifications to become up to date on the latest technologies and web design theories. Further, it has been discussed and approved that the Hardware Support person will make use of training in that specific area and become certified to work on Compaq desktops, making Franklin College a qualified service center for Compaq.

With each person in our department taking on additional responsibilities to create the Web Administrator position, the need for help in our day to day operation became apparent. The perfect solution to this dilemma was to utilize our SWAT team (Students With Access to Technology.

Student Employees.

Student workers have been an important part of Computing Services for a long time. They have worked as lab proctors and summer time employees for special projects. In 1997 when all the dorms were wired for student access to the network, six help-desk proctors were given additional training, first of all to provide support for students who had computers in their rooms. This group of student workers has proven invaluable over the last three years. Providing assistance with desktop deployment, trouble shooting and ResNet support, they have given much needed help in all areas of support.

Up to this point SWAT had only been used for basic support and limited trouble shooting. Last August we began a new training program for all student proctors and SWAT team members. While student proctor training concentrated mainly on software support to provide assistance in our computer labs, the SWAT team role became more crucial, surpassing their previous role of basic support.

Basically two levels of training were considered for all student workers. Proctors (and SWAT as needed) would participate in application software training. Franklin College decided to begin our own certification program that showed students' proficiency in various productivity software packages. SWAT training became more on the job training as we began taking them on more complicated service calls to increase their experience. Today the SWAT team provides advance desktop trouble shooting and networking assistance. Instead of the SWAT team members answering service calls alongside Computing Services staff, they are now resolving problems in place of the full-time staff, and are recognized as part of the IT team. Further, various members of our SWAT team have moved into roles supporting Web Development and Network Administration. The knowledge gained through the SWAT team provides invaluable experience when the student graduates and

enters the work force, and has helped many students gain information technology positions. The college recently hired one SWAT team member as a full time staff member.

What We Learned:

Computing Services is now a more efficient organization. This is in part the result of streamlining job functions so that each staff member is able to focus on his or her main responsibilities. The jobs were negotiated and designed to provide a growth path for every staff member, and those who felt they were growing stale have had an opportunity to learn something new and rekindle the kind of enthusiasm that is necessary in a demanding environment. It was important that we were able to make sure that everyone received the proper training for their new assignments; this built confidence, and so did the fact that the College was willing to invest so much in the staff. Shifting staff around meant that they can serve as resources for each other, and we have better backup for each position than we had before.

It would not have been possible to accomplish this reorganization without the change in campus culture that is the result of the work done by the Leadership Program. A "learning" organization involves all its members in decision making and change. We used all the techniques we had learned, and have become a stronger team by working through some very difficult issues. We believe that the process we employed is the most important part of the project, because the reorganization will be an ongoing undertaking as we strive to keep everyone focused and productive. The collaborative problem solving techniques are helping us resolve other issues as they come up, and everyone is comfortable with a methodology that requires full interaction and participation in tackling major projects.

Finally, it is also fair to say that what Computing Services did has reinforced the change towards a different campus culture. By accepting our proposal the administration acknowledged the value of our initiative and invited other groups to be proactive in finding workable solutions to difficult problems.

The Centralized Campus Calendar: A Case Study

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Introduction

This past spring Franklin College endeavored to draw together most if not all campus calendar information, including academic schedules and deadlines, athletic schedules, convocations and general campus events, into a single web-accessible database. The vision was to eliminate the duplication of information maintenance and distribution that occurred throughout campus with a standardized, flexible, centralized system that could be maintained by a limited number of "key" personnel and accessed in a variety of methods throughout our world wide web site. As you will see, numerous obstacles, both technical and non-technical, stood in the way of this project. A discussion of these and all other aspects of the project follows.

Background

Before addressing the specific project, a bit of background information is appropriate for means of perspective. Until the fall semester of 1999, Franklin College did not have a full-time web administrator. This position, as well as that of associate webmaster, was newly created in November of 1999.

Previously, webmaster duties were performed by the network administrator as time permitted. As is the case on most campuses, the primary tasks of the network administrator include installing and maintaining network servers, clients, printers and associated software, managing the various network hardware components and administering faculty, staff and student accounts. Web-related tasks were secondary and as can be guessed were given less than top priority.

Additionally, a campus committee has been in place since 1997 to address web-related issues. The Web Advisory Group (WAG) has been utilized to oversee a major re-design of the college web site, develop publishing standards and establish general policy as it pertains to the web. A few members of the group actually publish and maintain appropriate departmental pages as well. However, there was no one person whose sole responsibility was to manage and organize web tasks on a full-time basis.

While college administrators conceded the web is a valuable and important tool for recruitment and publicity, new funds were simply not available to add a full-time webmaster. Consequently, in August of 1999 Computing Services began discussing and planning a department reorganization that would ultimately free the current network administrator to assume the position of web administrator without additional staff. At the same time, Public Affairs made available part-time the assistant director of public affairs who is now also the associate webmaster. Coincidentally, the network administrator and the assistant director of public affairs have been standing members of the WAG since its inception. The latter now serves as chair.

Needless to say, a period of transition was necessary to allow Computing Services personnel to become familiar and comfortable with new roles. Numerous training classes and workshops were scheduled as part of this transition. Furthermore, turnover in two positions actually shortened the projected timetable for the transition. The parameters of the reorganization were actually simplified due to the skill sets of the two new hires.

Once the new web positions had been established, the next step was awareness and authority. This was accomplished mostly by communication from the president announcing the two new positions and requesting campus cooperation. This obviously opened many doors. Meetings with each of the departments is ongoing to identify needs, times for updates and allow the staff and faculty to voice their opinions about the web site.

In general, the Franklin College web site has a good overall look. However, in recent years it has been a hodgepodge of new pages and updated information coming from some faculty, several staff members and even a few students who have taken the initiative to learn a variety of web publishing software. In addition to the creation of the calendar, the list of challenges includes bringing what have been deemed "official" college pages (sometimes using the SWAG method) back into the fold, particularly with consideration to design, function and accuracy. The true challenge has been maintaining a consistent look and feel while allowing faculty, staff and students to use their creativity to make their own web pages linked to the site and have adequate ownership and input on "official" web pages.

The Problem

The Franklin College web site, like most college web sites, is replete with every type of calendar information imaginable. The list of people publishing calendar information was nearly as immense. As could be expected, our web site often contained duplicate if not contradictory information. Coordinating the accurate and timely presentation of events, deadlines and schedules to staff, faculty, students and their parents, local residents, prospective students and their parents, alumni and friends for the varied and specialized areas of sports, fine arts, academics and others rapidly became a priority.

Several issues came to the forefront as we began to investigate the feasibility and practicality of this project. To begin with, the student activities director, who manages a considerable amount of calendar data, was using *Calendar Creator Plus* to maintain numerous calendars. While this application is very useful and functional, it offers no scripted web interface to the data within it.

We also anticipated gathering all the events and any changes in a timely fashion to be a potential problem. We wanted to maintain strict control of who could make changes to the database. Yet, additions, corrections and cancellations could come from countless sources. Thus, we had the typical data integrity concerns. Most often, no information at all is better than incorrect or inaccurate information.

Perhaps the biggest challenge we faced was getting "buy in" from all the requisite constituencies. We were hopeful that the project would truly encompass all areas of campus. We were not asking departments to forfeit ownership of their calendar information. We merely wanted to assist them in maintaining and presenting it in a consistent, simple and professional manner.

The Plan

The first step of our plan was to identify the "key players" – the people on campus who had knowledge of the information we wanted to collect. Our list included:

- the sports information director
- the men's and women's athletic directors
- the director of student activities
- the director of public affairs
- the campus facilities manager
- the registrar
- the director of alumni relations
- the fine arts chair

Basically, anyone involved with organizing events of interest to campus, local residents, alumni and friends would be contacted.

The official start of the project was a meeting of the Web Advisory Group. Although one of the people to be approached individually about the calendar, specifically the director of student activities, was on the body, the subject was broached prior to that meeting to let her know of the plan, answer any objections and explain the details. Some sense of her requirements and responsibilities was ascertained as well. Unanimous approval was granted by the WAG.

The next step was to identify who would have access to input calendar items. As it now stands those are the web administrator, associate webmaster, director of student activities and secretary of public affairs. Each person has a designated area of responsibility. Flexibility is key, but careful consideration is being given to who has access. The group needs to be small for purposes of managing data input, but accessible to meet the needs of the campus.

Additional planning was needed in the area of training. *Microsoft Access 97*, the database engine that would be used to store and organize the calendar data, is campus standard software. Unfortunately, three of the aforementioned "key personnel" designated to enter data had little if any knowledge of *Access*. While a user-friendly interface is anticipated, plans for providing basic skills training in *Access* were made.

Aside from issues pertaining to *Access*, no other acquisition of resources or training was necessary. Existing Windows NT Servers were running Internet Information Server and Active Server Pages. The web administrator possessed the requisite knowledge of VBscript, the scripting language to be used to create the dynamic calendar pages.

The Process

The crucial first step was to verify that the data currently stored in *Calendar Creator Plus* could be exported to a format that could in turn be imported by *Access*. An initial table was created to receive the imported data with the expected fields such as "date", "start time", "end time", "event description", "location" and "event type". The last two fields ("location" and "event type") would later become coded lookup fields, linked to additional tables containing complete lists of possible values. Specialized fields for storing contact information and results of sporting events would be added at a later time. The "Save As" feature of *Calendar Creator Plus* was used to create a "comma-delimited" file which was quickly and easily loaded into the initial *Access* table. With minimal editing, the data was ready to be rendered into an Active Server Page document.

The "event type" field made it possible to easily amass multiple calendar types into a single table. Specifically, the academic calendar, convocations calendar, all athletic schedules, student organization events and more are stored in a single table in the *Access* database. We quickly realized, though, that a number of events were restricted to the campus community. This necessitated the addition of a "public" field with a simple data type of "Yes/No". Consequently, calendar displays on our Internet (http://www.franklincollege.edu/) site will contain only public events. On the other hand, pages on our Intranet site will ignore this field and show all events.

One of the nice features *Access* provides is the ability to select a variety of "text" field data types. An actual "text" field is limited to 255 characters. It was envisioned that HTML tags would be embedded within the "event description" field to provide extra formatting such as bolded or italicized text or even hyperlinks to other pages. The character limit was often exceeded once these tags were inserted, particularly when an anchor tag was used. Consequently, the "event description" was given a data type of "memo" which allows up to 64,000 characters.

Another handy data type featured in *Access* is the "hyperlink" type. A "hyperlink" field consists of three separate parts separated by the pound sign character ("#") as follows:

displaytext#address#subaddress

The *address* part of the field contains any valid uniform resource locator (URL) or universal naming convention (UNC) path. The *subaddress* can contain an optional location within the specified *address* just like an anchor tag that includes a **NAME** attribute. A few examples of text found in a "hyperlink" field would be:

My Home Page#http://www.franklincollege.edu/myhomepage.html#links
My Home Directory#\\myserver\myusername

It is anticipated that additional fields will be inserted (including a "hyperlink" field) that will allow detail pages to be dynamically generated for specified events.

Once the various individual calendars had been imported to the *Access* database, a general page was composed and posted to the Franklin College Intranet site (a.k.a. "The Growl"). This page allows the browser to select a specific calendar type or to view "All Events". It also permits the selection of a wide variety of date ranges including:

- Today
- This Week
- Next Week
- This Month
- Next Month
- Next 30 days
- Next 60 days
- Next 90 days
- Next 180 days

The user can also specify "none" to view all events of the selected type. To this point, all feedback had been positive.

While the calendar database was being developed and implemented on the web, meetings with the student activities director continued. In fact, it quickly became apparent exactly how much of the calendar information she entered, maintained and produced. The list of "key players" was reduced significantly. However, for mostly political reasons, the registrar and the athletic directors were still viewed as crucial with respect to "buy in".

In preparation for meeting with the registrar, a customized page was prepared which displayed only academic calendar information. The browser will see the current academic year by default but can choose to view one of the two subsequent years as well. A number of the events or deadlines feature hyperlinks to pertinent web-based forms such as the *Schedule Adjustment Form* or the *Request for Pass/Fail Grading*. The registrar was extremely pleased to learn of the project and requested only minor modifications to the page prepared for her.

On a less positive note, an impromptu discussion between the associate webmaster and the campus facilities manager revealed some major opposition. The facilities manager is responsible for scheduling space for various events requested by both on-campus and off-campus groups and organizations. Her objections stem from the fact that an event calendar does not reflect the time needed for setup and breakdown of rooms. Her fear is that on-campus groups looking for a place to meet will refer to such a calendar and assume a room is available if no event is scheduled when in fact facilities personnel need to prepare the room for a future event. Apparently, this has been a problem for quite some time. We decided that this was a procedural matter beyond the scope of this project and pressed on despite her objections.

The Project (and its future)

As of the completion of this paper, the campus calendar is being used internally. The student activities director has been trained in the use of *Access* and will be exporting certain data from *Access* to *Calendar Creator Plus* only to take advantage of some of its advanced printing features. In addition, a significant amount of data has been either imported or added to the *Access* database and plans are being made to formalize procedures for entering event data.

Immediate future plans include the addition of a general calendar page for the Franklin College Internet site, which will provide access to all events available to the public. Customized athletic schedules will be composed as well as a general weekly athletic schedule. Data fields that will make detailed event pages possible will be added also.

By and large, the possibilities are limitless. With one exception, reaction has been tremendously positive. The project promises to dramatically improve the accuracy and consistency of event information available on our Internet and Intranet sites, making them valuable resources for years to come.

A Web Based Discussion Board

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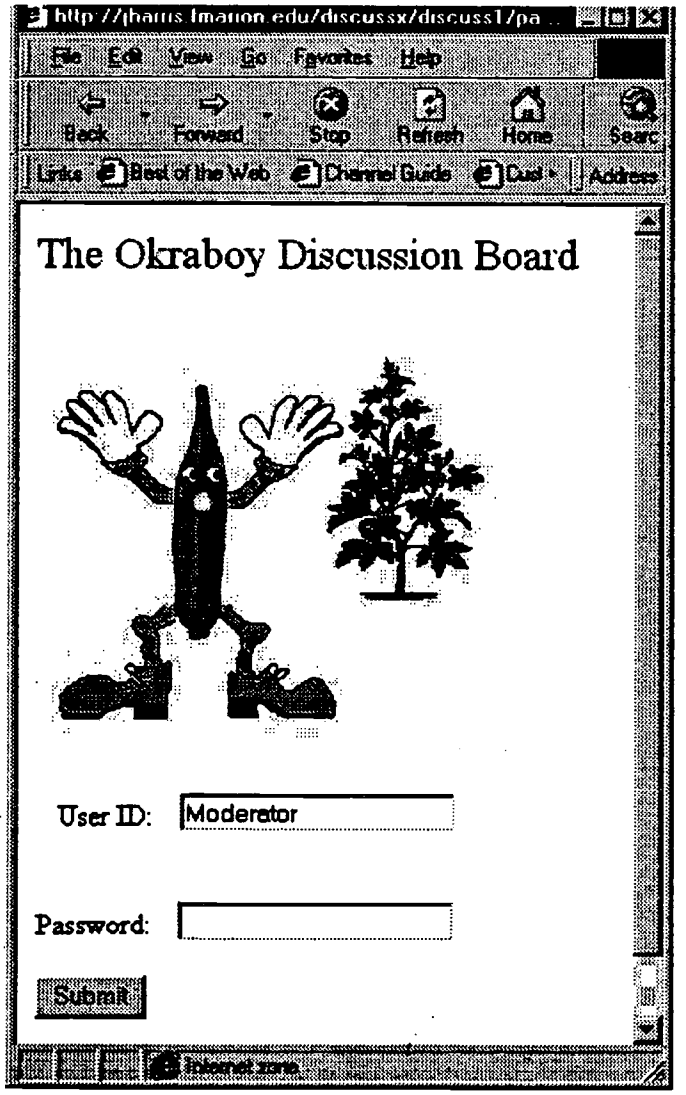
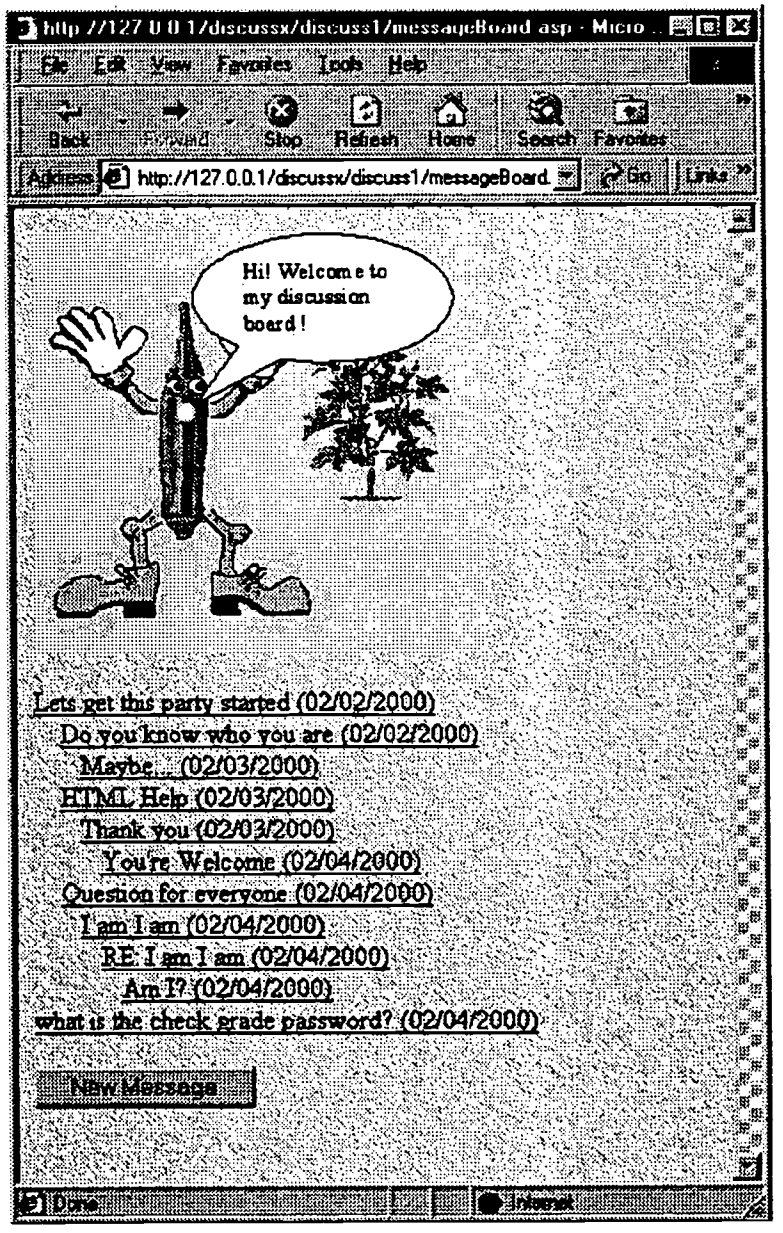
On looking for a good freeware web-based discussion board for use in my classes, I noticed one thing - there are none, so I went about writing my own discussion board.. The source code and installation instructions can be downloaded from my web site at **jharris.fmarion.edu**.

Using the Discussion Server

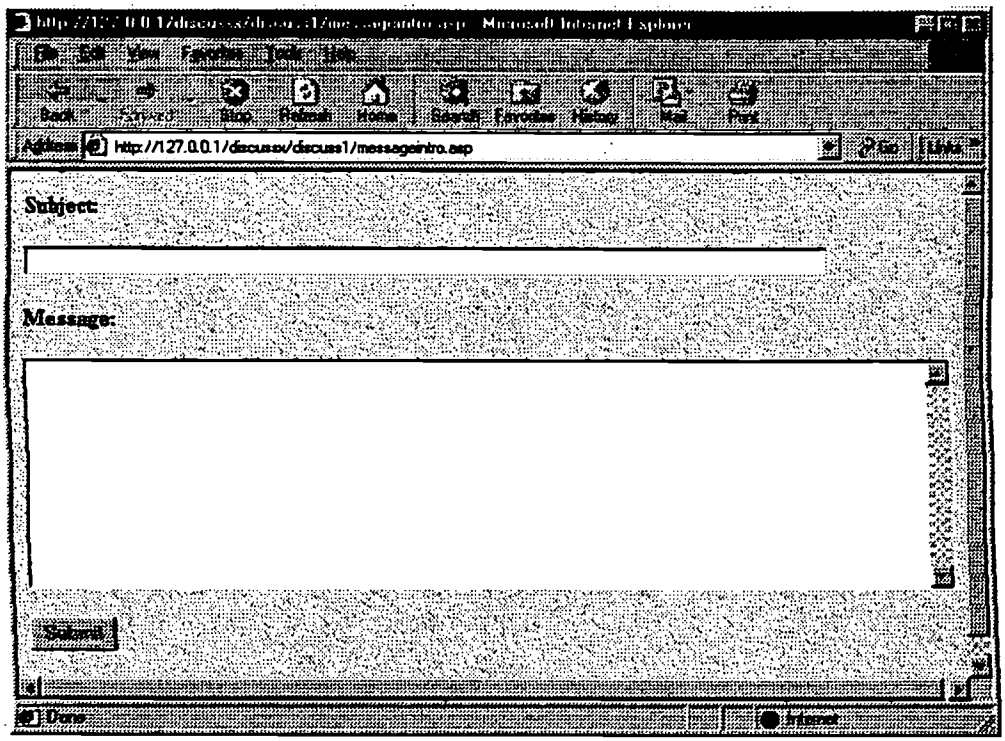
Upon entering the proper URL the following screen is presented:



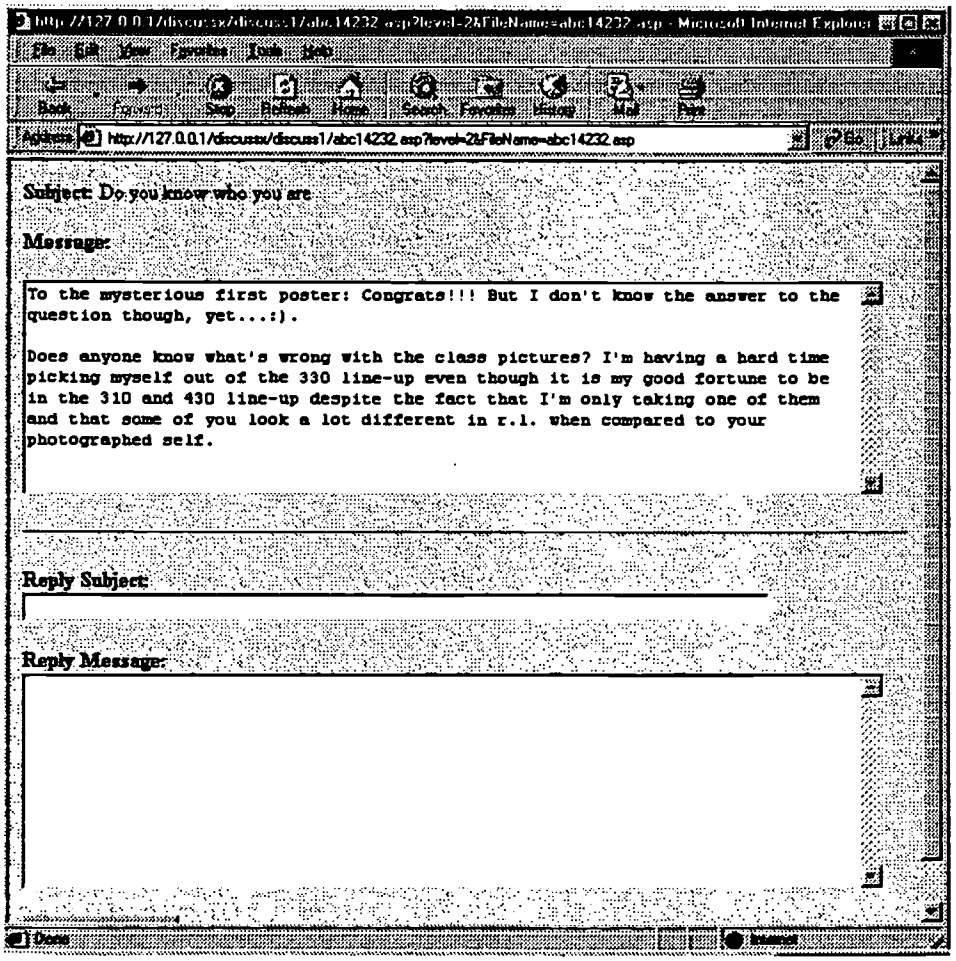
After typing in the User ID and Password, the message board is displayed:



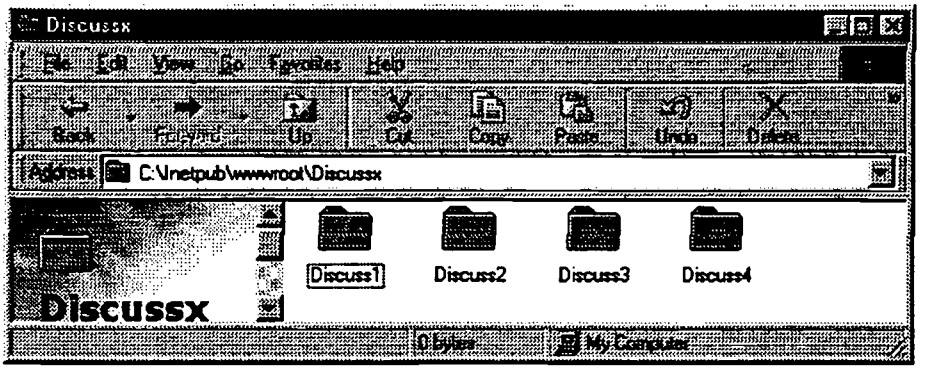
New messages titles appear left justified and replies are indented. The message titles are dated, but the author remains anonymous. A new message can be entered by pressing the "New Message" button. The following screen is displayed when the "New Message" button is clicked.



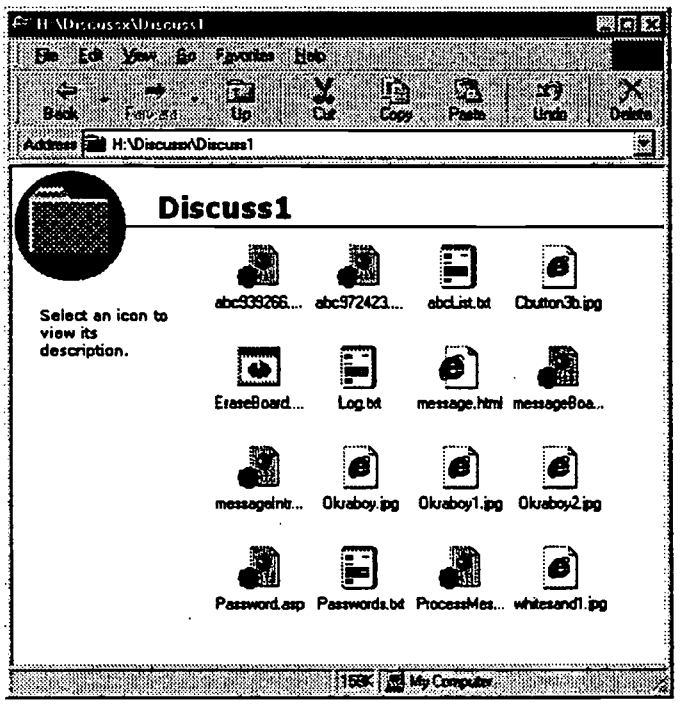
A message can be replied to by clicking on the message title and then follow screen is displayed:.



Installing the software



The entire discussion server can be downloaded from jharris.fmarion.edu. The file "discuss.zip" needs to be unzipped into the root directory of a web server that is capable of running Active Server Pages (Microsoft Personal Web Server (Win 95/98) or Microsoft Internet Information Server). The main directory Discussx contains four subdirectories. Each subdirectory corresponds to a different discussion board and contain similar files.



Each discussion board folder contains the following files. Files that begin "abc" and end in "asp" are the messages .

Other files that end with "asp" are active server pages files and are the scripts that execute when the discussion board is running.


Password.asp


messageIntro.asp


messageBoard.asp


ProcessMessage.asp

The file "abcList.txt" contains the list of the message titles.


abcList.txt

The file Log.txt is a log file that contains information about who accesses the discussion board and when.


Log.txt

A sample Log file is shown below.

Moderator logged on at time: 4:45:45 PM date: 01/28/2000
jmoore logged on at time: 11:33:08 AM date: 02/02/2000
jmoore wrote message: Lets get this party started at time: 11:35:26 AM date: 02/02/2000
mwalters logged on at time: 1:15:28 AM date: 02/03/2000
mwalters wrote message: HTML Help at time: 1:24:15 AM date: 02/03/2000

Password are kept in the file Passwords.txt


Passwords.txt

Passwords are set up as follows:
Username1
Password1
Username2
Password2
etc. etc.
A sample password file is shown below:

Moderator
abc123
BJones
qzxcd123

The password file needs to be set up by the discussion board administrator.

To erase all messages and start from the beginning run the program "EraseBoard".


EraseBoard.bat

This program deletes all message, but does not alter the password file.

In order for students to access the discussion board, a link is needed to the file "password.asp". For example, the link on my web page to one of of my discussion boards is http://jharris.fmarion.edu/discussx/discuss1/password.asp (I run a web server on the machine in my office). If you have any questions on how to set up the discussion board, please feel free to e-mail me at jharris@fmarion.edu.

The source code for each of the Active Server Pages scripts is shown below.

```
<!-- Password.asp -->
<!-- Written by Jim Harris  Francis Marion University  All rights reserved -->
<%@ Language=VBScript %>
<HTML> <HEAD> <META NAME="GENERATOR" Content="Microsoft Visual Studio 6.0">
</HEAD> <BODY>
<% 'Determining the path of the "Discuss" directory
   SName = Request.ServerVariables("script_name")
   L = len(SName)
   for i = 1 to L
    if mid(SName,i,1)="/" then mark = i
   next
 fp = left(SName,mark-1)
 Session("folderPath") = Request.ServerVariables("http_host") + fp  %>
<P><FONT color=red face="" size=5>The Okraboy Discussion Board</FONT></P>
<IMG SRC="okraboy.jpg"></P>
<FORM action="http://<%=Session("folderPath")%>/messageBoard.asp" id=FORM1 method=post
name=FORM1>
<P>   User ID:   
<INPUT id=uscrid1 namc=uscrid1 typc=tcxt sizc=20></P> <BR>
<P>Password:   
<INPUT id=password1  name=password1 type=password size=20></P>
<P><INPUT id=submit1 name=submit1 type=submit value=Submit></P></FORM>
</BODY> </HTML>
<!-- End of Password.asp -->


<!-- MessageIntro.asp -->
<!-- Written by Jim Harris  Francis Marion University  All rights reserved -->
<%@ Language=VBScript %>
<HTML><HEAD></HEAD>
<BODY Background="whitesand1.jpg">
<FORM action="http://<%=Session("folderPath")%>/ProcessMessage.asp" id=FORM1 method=post
name=FORM1>
<P><B>Subject:</B></P>
<INPUT id=Subject name=Subject  size=80> </P>
<B>Message:</B>
<P><TEXTAREA id=Message name=Message Rows=10 Cols=80></TEXTAREA></P>
<P><INPUT TYPE=hidden Name=level Value=0>
<P><INPUT TYPE=hidden Name=FileName Value=New>
<P><INPUT id=submit1 name=submit1 type=submit value=Submit></P></FORM>
<P></FORM></P>
</BODY> </HTML>
<!-- End of MessageIntro.asp -->
```

```
<!-- MessageIntro.asp -->
<!-- Written by Jim Harris  Francis Marion University  All rights reserved -->
%@ Language=VBScript %>
<%  'Determining the path of the current directory
   SName = Request.ServerVariables("script_name")
   L = lcn(SNamc)
   for i = 1 to L
    if mid(SName,i,1)="/" then mark = i
   next
fp = lcft(SNamc,mark-1)
Session("folderPath") = Request.ServerVariables("http_host") + fp

 'Making a DOS path to the current Directory
 DOSfp="" for i = 1 to len(fp)
  if mid(fp,i,1) = "/" thcn
   DOSfp = Dosfp+"\"  else
   DOSfp = DOSfp + mid(fp,i,1)
  end if
next
 Session("DosPath") = Server.MapPath("\")+ DOSfp

'Making sure the password is there
 if Request.Form("password1")="" then
   password = Session("password")
   userid = Session("userid")
 else
   Session("password") = Request.Form("password1")
   Session("userid") = Request.Form("userid1")
   password = Session("password")
   userid = Session("userid")
 end if

 passchcck = falsc
 dim mPass
 dim mPStream
 Set mPass = Server.CreateObject("Scripting.FileSystemObject")
 PassPath = Scssion("DosPath") + "\passwords.txt"
 set mPStream = mPass.OpenTextFile(PassPath)
 do while not(mPStream.atEndOfStream)
   x = mPStream.Readline
   y = mPStream.ReadLine
   if x = userid and y = password then
    passcheck = true
    exit do
   end if
 loop
 if not(passcheck) then
   Response.Redirect ("Password.asp")
 end if
mPStream.Close
set mPStream = nothing

if Session("alreadyLogged")<>1 then
  dim logStrcam
  dim wString
  LogPath = Session("DosPath") + "\Log.txt"
```

```
  set logStream = mPass.OpenTextFile(LogPath,8,true)
  logStream.Write userid
  logStream.Write " logged on at time: "
  logStream.Write Time()
  logStream.Write "  date: "
  logStream.Write Date()
  logStream.close
  set logStream = nothing
 end if
 Session("alreadyLogged")=1 %>

<HTML> <HEAD></HEAD> <BODY Background="whitesand1.jpg"> <%
'Reading and displaying the MessageList File
  Set mFile = Server.CreateObject("Scripting.FileSystemObject")
    MessageListPath =  Session("DosPath")+"\abcList.txt"
  %><IMG SRC="okraboy1.jpg"><BR><BR><%
     set mStream = mFile.OpenTextFile(MessageListPath,,true)
  do while not(mStream.atEndOfStream)
    'Read in a record
    levelStr=mStream.Readline
    level = Cint(levelStr)    Filename=mStream.Readline
    DateTime=mStream.ReadLine    Subject=mStream.Readline
    'Send formatted HTML to the client
    'Put in spacing
    for i = 1 to level-1      %>   <%
    next
   FilePath = Session("folderPath")+"/"+FileName   %>

   <A HREF="http://<%=FilePath%>?level=<%=level%>&FileName=<%=FileName%>">
<%=Subject%> (<%=DateTime%>)</A><BR>
<% loop
    'Clean up
    mStream.close  set mStream=nothing  set mFile=nothing %>
<FORM action="http://<%=Session("folderPath")%>/messageintro.asp" method=POST id=form1
name=form1>
<INPUT type="submit" value="New Message" id=submit name=submit>
</FORM>
</BODY> </HTML>
<!-- End of MessageBoard.asp -->

<!-- ProcessMessage.asp -->
<!-- Written by Jim Harris  Francis Marion University  All rights reserved -->
<%@ Language=VBScript %>
<HTML> <HEAD> </HEAD>
<BODY Background="whitesand1.jpg"><FONT face="" size=4>
<% 'Getting the level and FileName info from the requesting form
  oldFileName = Request.Form("FileName")
  level = Request.Form("level")
  dim mFile, mStream, mStreamOut, mStreamIn, mStreamTemp

 'Creating a file system object
   Set mFile = Server.CreateObject("Scripting.FileSystemObject")
  oldListPath= Session("DosPath") & "\abcList.txt"
  set mStreamIn = mFile.OpenTextFile(oldListPath,,true)
  newListPath=Session("DosPath") & "\List.tmp"
  set mStreamOut = mFile.CreateTextFile(newListPath)
```

```
'Creating a random file name
Randomize Timer
RndFileName = "abc"+cstr(int(rnd*1000000)) + ".asp"
set mStream = mFile.CreateTextFile(Session("dosPath") & "\"+ RndFileName)

'Placing the record in the abcList.txt file
if level > 1 then  'For Replies
while not(mStreamIn.atEndOfStream)
 x = mStreamIn.ReadLine
 if x <> oldFileName then
  mStreamOut.Writeline x
 else
  mStreamOut.WriteLine x   'finish writing out the file name of parent
  mStreamOut.Writeline mStreamIn.Readline 'Write out date
  mStreamOut.Writeline mStreamIn.Readline 'Write out subject
  if mStreamIn.atEndOfStream then                    'if at the end - ok
    mStreamOut.WriteLine cstr(level+1)
    mStreamOut.WriteLine RndFileName
    mStreamOut.WriteLine date
    mStreamOut.WriteLine Request.Form("Subject")
    finished = true
  else
   x = cint(mStreamIn.ReadLine)

   'Skipping over records at the same level
   do while x = level + 1
    mStreamOut.WriteLine cstr(x)                                    'Write out level
    mStreamOut.WriteLine mStreamIn.ReadLine  'Write out file name
    mStreamOut.WriteLine mStreamIn.readLine  'Write out date
    mStreamOut.WriteLine mStreamIn.ReadLine  'Write out subject
    if mStreamIn.atEndOfStream then exit do  'inserting at the end
    x = cint(mStreamIn.ReadLine)
   loop
  end if

  'Writing out the record
  if not(finished) then
    mStreamOut.WriteLine cstr(level+1)
    mStreamOut.WriteLine RndFileName
    mStreamOut.WriteLine Date
    mStreamOut.WriteLine Request.Form("Subject")
  end if
 if not(mStreamIn.atEndOfStream) then mStreamOut.WriteLine cstr(x)
 end if
wend
else  'For new messages
 while not(mStreamIn.atEndOfStream)
  x = mStreamIn.ReadLine
  mStreamOut.WriteLine x
 wend
 mStreamOut.WriteLine cstr(level+1)
 mStreamOut.WriteLine RndFileName
 mStreamOut.Writeline Date
 mStreamOut.WriteLine Request.Form("Subject")
end if
mStreamOut.Close
```

```
    mStreamIn.Close
    set mStreamOut = Nothing
    set mStreamIn = Nothing
    mFile.CopyFile newListPath,oldListPath,true

    'Writing out the necessary HTML and ASP code
    mStream.WriteLine "<HTML><HEAD></HEAD><BODY BACKGROUND=whitesand1.jpg>"
    mStream.WriteLine "<B>Subject:</B> "
    mStream.WriteLine Request.Form("Subject")
    mStream.WriteLine "<BR><BR>"
    mStream.WriteLine "<B>Message:</B><BR>"
    textAreaString = "<FORM><TEXTAREA id=Message1 name=Message1 Rows=10
Cols=80>"+Request.Form("Message")+"</TEXTAREA></FORM>"
    mStream.WriteLine textAreaString
    mStream.WriteLine "<HR>"
    mStream.WriteLine "<FORM action=""ProcessMessage.asp"" id=FORM1 method=post
name=FORM1>"
    mStream.WriteLine  "<B>Reply Subject:</B><BR> <INPUT id=Subject name=Subject
size=80><BR><BR>"
    mStream.WriteLine "<B>Reply Message:</B><BR>"
    mStream.WriteLine "<TEXTAREA id=Message name=Message Rows=10 Cols=80></TEXTAREA>"
    mStream.Write "<INPUT TYPE=Hidden Name=level Value=" + cstr(Level+1) + ">"
    mStream.Write "<INPUT TYPE=Hidden Name=FileName Value=" + RndFileName + ">"
    mStream.WriteLine "<BR><BR><INPUT id=submit1 name=submit1 type=submit value=""Submit
Reply"">"
    mStream.WriteLine "</FORM></BODY></HTML>"

    'Cleaning up
    mStream.Close
    set mStream = Nothing
  dim logStream, wString
  LogPath = Session("DosPath") + "\Log.txt"
  set logStream = mFile.OpenTextFile(LogPath,8,true)
  logStream.Write Session("userid")
  logStream.Write " wrote message: "
  logStream.Write Request.Form("Subject")
  logStream.Write " at time: "
  logStream.Write Time()
  logStream.Write "  date: "
  logStream.WriteLine Date()
  logStream.close
  set logStream = nothing
  set mFile = nothing %>
<B><IMG SRC="http://<%=Session("folderPath")%>/okraboy2.jpg"></B></FONT> 
<FORM action="http://<%=session("folderPath")%>/messageBoard.asp" method=POST id=form1
name=form1><INPUT type="submit" value="Return" id=submit1 name=submit1>
</FORM>
</BODY>
</HTML>
```

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Implementing a Web-Enhanced Compressed Video Education Curriculum: A Case Study in Inertia

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Background

USC Sumter is a regional campus of University of South Carolina System that offers the first two years of coursework towards baccalaureate degrees. It also offers a half dozen four-year degrees though articulation agreements with other USC campuses. In the 97-98 academic year, discussions were underway with USC Spartanburg to offer a baccalaureate degree in Education on a joint basis. USC Sumter students and faculty were interested in offering courses in Sumter and continuing discussions were leaning toward offering part or all of the program via distance education originating in Spartanburg. This would allow Sumter students to obtain their four-year degree without having to commute to Spartanburg. Neither institution had experience in the use of distance education at this level so there was serious concern on the part of the Education faculty at both institutions. There was no infrastructure in place for offering compressed video courses at either campus, although there was definite interest exhibited by the computer services staff at USC Spartanburg. The impetus could definitely be described as "top down" as faculty at both institutions had neither experience with, nor excitement about the prospect of offering such a curriculum via distance education technology. It is safe to say that at least some of the faculty perceived compressed video interactive television course offerings to be inferior to the traditional classroom approach. There was fear and apprehension that resulted in a great deal of inertia. Nevertheless, the decision to move ahead was made and the timetable was very aggressive. The faculties at both USC Spartanburg and USC Sumter had little or no experience in offering courses through compressed video technology. This resulted in a great deal of resistance on their part since they had never "bought into" the whole idea to begin with. This paper describes the first eighteen months of experience in implementing a web-enhanced compressed video program.

Susan's Account

In the summer of 1998, I was informed that I WOULD be teaching a course utilizing that technology, even though I had no experience whatsoever with it. Without question I believed this method to be inferior to the traditional classroom I had always taught in. I felt like I would be asked to water down the content area that was supposed to be covered. This is not the type of Education program I was originally told we were going to have. In fact, it was drastically different. Worse than that, it was a way of teaching I did not even believe in. Not only was I scared to death, I was furious and angry. I contacted the Interim Regional Provost to find out if I would be forced to take on this teaching assignment. I wanted to know my rights as a tenured faculty member. I also talked with my Dean to see if there were any other positions I could be moved into or that I could apply for. While on vacation I entertained the idea of looking for another position. However, recently earning tenure

made it even harder to think about giving up my position. I decided I would try to "hang in there" and try it for a semester and then look at my other options if I still felt the same way about my new job responsibilities.

After resigning myself to the fact that I would have to teach by this method, I decided to request some training from an expert in the field. I mentioned working with a person who had done some consulting at the University of South Carolina Spartanburg. I was given release time and immediately made plans to go to the University of Louisville to work with Dr. Denzil Edge, a nationally recognized leader in the area of distance learning. Now the challenge of removing the mental blocks and subsequent inertia was at hand. I also was not slated to teach in the compressed video environment until the spring semester of 1999. That did give some breathing room and lessened the time pressure.

Steve's Slant

As a mathematician, who has been retread into a computer applications professor, I am always looking for opportunities to implement technology into the classroom. I know from experience that technology, when properly utilized, can enhance the learning experience of most students and many professors. When I learned that our campus would soon have the capability to originate interactive compressed video courses, I was excited. I knew my recent work in the development of on-line course enhancement tools would find fertile soil (without the need for all that fertilizer!) in our new Education curriculum. Being relatively new to the tools myself, I believed I could introduce them to our Education faculty so they could explore the ever-expanding world of on-line tools in a non-threatening way.

I developed a grant proposal to implement web based course tools for our distance education courses to be offered on the Sumter campus that fall and spring. I was convinced that WebBoard (the tool of choice at that time) would enable faculty to provide on-line announcements, discussion areas, electronic submissions and improved communication between students at distant sites. What I was unaware of was the highly charged atmosphere created by fearful and apprehensive faculty and under-informed students. In Spartanburg, the students did not learn of the change in approach until they entered the classroom the first day to find TV sets instead of a professor! With hindsight, I now understand the less-than-stellar reception on the part of faculty and students that first year. In this paper, we discuss how we overcame this inertia, we describe the current state of affairs, and our plans for the near future.

The Fears

One of the main fears on the part of the faculty was that they would end up looking no better than "talking heads" in this new format. Along with that fear came the natural assumption that faculty would lose the personal contact with the students at the distant sites. They also feared they would have to sacrifice their educational values on which they prided themselves. They thought that students would subsequently feel cheated, since Education programs usually pride themselves on utilizing a wide variety of teaching techniques including personal contact, small group discussion, group presentations, and demonstrations of project work. This is a curriculum where contact was paramount and personal attention was valued highly and expected by all.

The faculty were upset that they were handed an ultimatum that the interactive TV courses WOULD be offered, and that they had little choice but to adapt, or move. Basically, they feared losing "themselves," the part of them which grew up in traditional educational settings they considered to be highly creative and not rigid- where lecturing was not the primary means for the teaching/learning environment. In education classes students are not expected to be passive learners sitting in their seats. They are expected to be engaged in discussion with the teacher as well as their peers. The professor typically liked walking around the room engaging and dialoging with students in large and small group discussion work. Some information would be delivered to the students in a lecture format to build a foundation for further learning, but lecturing was NOT the primary instructional vehicle. Learners are expected to think critically, solve problems, and perform independent research, rather than having information spoon-fed to them. Susan recently received tenure and was honored as a finalist in the "Governor's Professor of the Year" competition, was already exploring alternative career choices. Another twist occurred the summer before classes started. Susan had planned to do research and have preparation time without a teaching load, was suddenly transformed into a crash course in compressed video technology and the required teaching adaptations necessary to be successful in that environment. There were numerous unexpected summer meetings, and Susan could not attend them all due to prior commitments. Needless to say, she was "not a happy camper!"

The Turning Point

The reticent faculty member was given the opportunity to visit an institution that has a lot of experience in distance education. Support came from Dr. Carolyn West, the Interim Vice-Provost who took on the role of mentor. The Special Education Program at the University of Louisville is offered via a distance education under the auspices of Dr. Denzil Edge who is nationally recognized in this area. With his guidance and encouragement, Susan returned with less fear and the motivation to give it a try whatever "IT" was. All the while, she had a hard time believing she could be an effective teacher using this medium. She suddenly looked upon the situation as an opportunity rather than a challenge.

The First Class Begins:

The main thing Dr. Edge stressed was "know your content." Even though Susan was versed in the area of Early Childhood I had never taught this particular course (SEDE 420: Young Child Behavior and Development) before. She needed to read the two textbooks carefully and review the research in the field. She began reading the subject matter early so she would feel more comfortable and confident about delivering the content. She then began figuring out how to deliver the content i.e., how many minute segments I would be spending either in lecturing, discussion, feedback, questions, comments, airing brief video clips, audio tapes (I incorporated music), visuals to be shown on the document camera, etc. Susan knew she needed to keep things moving and to keep the student's interest. She needed to balance the time spent disseminating material with time to hear from students. She was also concerned with how she would cover what she was supposed to cover while giving the Sumter students in front of her eye contact. At the same time, she had to be sure she was attending to the Spartanburg students as well. She knew that they needed to feel a part of the classroom. She had to make sure she was looking in the direction of the correct camera and waiting a couple of seconds before responding or she would not be able to hear a students comment or question, due to audio delay. Fortunately, Jean Brown, the media specialist was there with me to guide me every step

of the way. Susan had a run-in with Jean's supervisor a couple of days beforehand because she wanted the Sumter faculty to be able to operate the equipment unattended. She did not realize the numerous technical difficulties we were about to experience—like the system failing. There were several class periods when we experienced technical difficulties, which are not uncommon. However, the media specialist was the one that knew how to address these problems, not the faculty member. Dr. Edge reinforced numerous times that the professor's job is to be the expert in the content material and the university's job was to provide the support team to assist in typing, PowerPoint development, library support, etc.

Susan was also told that visuals, like Power Point were very effective but was still trying to finish mastering all the content she wanted to cover and figuring out how she was going to teach, and how students were going to learn, respond, and act. So, the last thing on her mind was learning how to develop my own Power Point presentations. She happily reports that, one year later, she is developing many of her own PowerPoint presentations. Initially a great deal of time was spent on logistics like calling Spartanburg to find out if materials had arrived on time, where materials were, who would pick the materials up, who would copy materials. Another concern was identifying who would be operating the equipment on the Spartanburg site (my first semester a student who was taking my class was asked to operate the equipment). Concerns continued in trying to identify who would be sending me assignments, who would pick up course materials, who would proctor quizzes and exams, etc. The list could go on and on—much like the time that was involved. Susan was also trying to get assignments graded quickly so students could get papers returned to them in a timely fashion. We did not have a secretary hired for the Spartanburg program yet, so the USC Sumter division secretary was asked do all of this extra work. She had not bargained for the added responsibilities. That added another problem. Who was going to assist Susan with those new responsibilities?

Some Techniques Did Not Work Well (Yet)

One of the biggest challenges was how to make the students in Spartanburg feel a part of the class every bit as much as the on-site students, and to feel that the professor was trying to get to know them. Susan had to find a way to bridge the distance because the off-site students already felt that this program was not benefiting them. They felt like the Sumter students were the ONLY ones that were benefiting from the collaboration. Steve tried to come to the rescue. He strongly encouraged me to implement on-line collaborative tools to help develop a cohesive feeling between Spartanburg and Sumter students. The first semester, they looked upon the on-line tools as "just another new thing to learn" and they claimed they simply did not have the time nor the inclination to learn ANOTHER new technology. In our first year, it is safe to say that the on-line tools were not embraced by students nor the faculty as they had all they could handle just keeping their lips above the water-line with the interactive compressed video technology. Steve decided to lay low and not press the use of on line tools any more the first year, while at the same time planting seeds with Susan as to how the course could can be enhanced with on-line tools with a relatively small investment of her time.

Another challenge she had was trying to read expressions on the students faces and encouraging students to participate in class discussions. On compressed video technology, students take on a "flattened" appearance so it is difficult to read their expressions without extreme close-ups. Many students were not yet comfortable with the camera zooming in on them and some students didn't want to be on camera asking questions in front of the whole class. Some students who would not

have been verbal in a traditional classroom setting were even more intimidated in this setting. She would call on students if they did not initiate answering questions or making comments, in order to expose them to the use of the microphones and cameras.

Some Old Techniques Worked

Susan provided the students with self-addressed postcards so they could provide feedback to let her know how they were feeling about their interactive experience. During the semester she drove to Spartanburg three times to teach from their site to reinforce the fact that they WERE an integral part of the course. Many of these students attended an early Childhood Education conference Susan was attending in the state so I was able to see them there as well. Still, she believed they had not bought in to the concept of distance education courses. It would take time.

She found out that she could still implement many of the same teaching techniques and strategies she had previously employed. Students could still participate in small group work and they were still able to engage in student presentations and projects. She didn't move about the room as much as she used to, but she could move around the room a little. It wasn't quite the same though because students were seated at long tables that weren't movable. We could move some of the chairs and some of the students could cluster together in small groups. One-on-one partnering between students actually worked better because they could just turn to one another and collaborate.

Student Punctuality

Several students had difficulty being punctual to class. The class began at 8:30 and some students arrived late to class. Some of the students on the Spartanburg and Sumter campus were at times less attentive because a teacher was not physically in front of them. In defense of the students, the scheduling of classes should be reevaluated. Presently, the majority of students are in this particular classroom from 8:30-12:30. Students don't get a typical break because sometimes professors are still fielding questions from students because students know that this might be the only time they can have access to the professor (visually). I think they are now realizing that the on line tool we now utilize (Blackboard) is a wonderful tool to use when wanting to converse with me and their peers. They may not be able to see their peers or me but they are seeing that effective and efficient communication can take place between the student and the professor as well as student-to-student.

BlackBoard

After the initial disappointing experience with on line tools, Steve came back on the scene. USC adopted Blackboard as the official on line tool and made it available to all faculty at all USC campuses under their site license. Steve was an early adopter in the pilot study and implemented Blackboard in five courses in the summer and fall 1999 semesters. He realized great benefits in the contract graduate education course he was teaching at Sumter High School for K-12 educators. He realized that its capabilities include: announcements, course and staff information, posting of course documents, posting assignments, calendars, email support, the posting of external links, discussion boards and many other tools. He was "sold" and his enthusiasm was contagious. He cautiously approached Susan again time to see if she had an interest in implementing this on line tool to help

build cohesiveness and flexibility. His patience and gentle approach helped this neophyte lose the fear and doubt that was built up after the first experiences with on line tools.

The use of Blackboard had dramatically changed the dynamics of the distance education classes. Steve provided the encouragement and support to demonstrate the effectiveness of this excellent tool. He made sure that Susan took charge and explored its capabilities as she was ready for them. She assumed Blackboard would be very time consuming and not very cost-effective. Her opinions quickly changed as she gained more hands-on experience under Steve's guidance.

Things Get Better

An interesting phenomena occurred the second year the distance education courses were offered.. The new students entering the program did not feel old "negatives" of the previous class. They were neither threatened nor surprised by the interactive compressed video format. Students figured out THEY need technology in their curriculum and suddenly looked upon Blackboard as an opportunity rather than "yet another task to perform." Blackboard was perceived as more straightforward to learn and utilize than the tool used in the first year. There were more features built in, and one of the best features was that the site license prevented further financial investment in infrastructure. In general, there was a LOT LESS negativity on the part of students and faculty. Steve has remained a patient product champion and Susan has identified what a positive influence it can be and the many advantages it provides. For those interested in visiting an active Blackboard site, feel free to visit one of these URL's or email either of us for a list of current courses.

BlackBoard sites:

http://courses.sc.edu/courses/CSCI101
http://courses.sc.edu/courses/SEDU420
http://courses.sc.edu/courses/EDUC697

If you have not had the opportunity to see the "front end" of a Blackboard Site, we have included screen clips so you can see some of its power. Figure 1 is the first thing students see after they successfully enter the URL and enter their user ID and password.

This medium allows announcements to stay on the site until the instructor removes or modifies them, forever nullifying the complaints about students "losing their handout, never having received the announcement via email, or accidentally erasing their email that contained the announcement. They can access it from ANY on line computer anywhere in the world. This alone is worth the "price of admission"

Figure 1--http://courses.sc.edu/courses/SEDU420

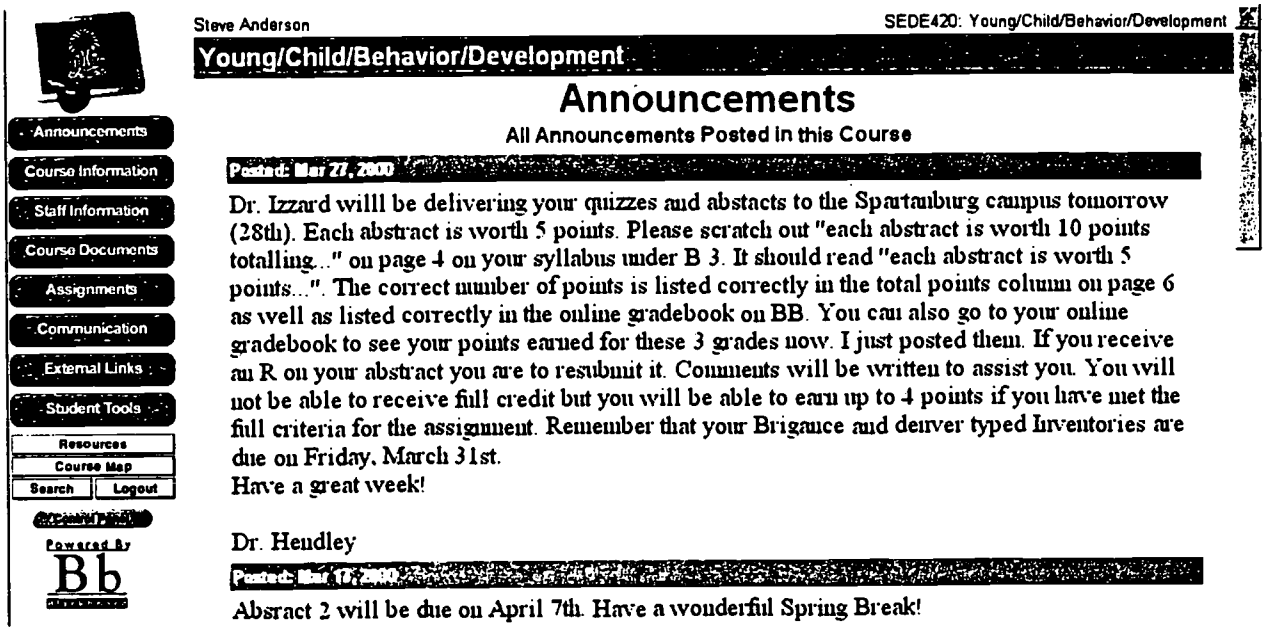
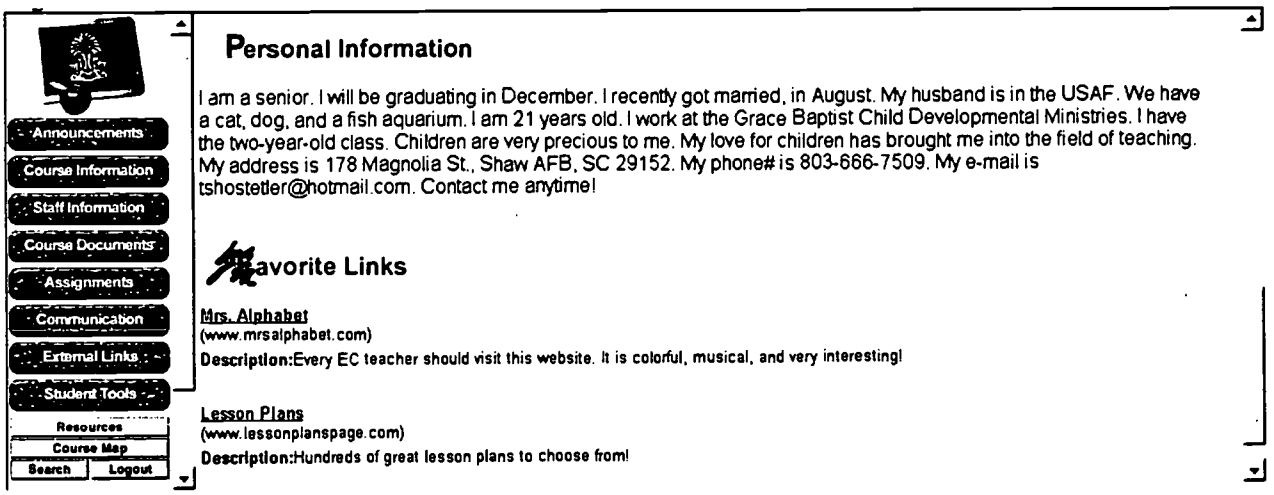


Figure 2 displays a great ice-breaker to introduce Blackboard early in the course. The student is asked to share information about themselves so that others in the class can get to know them and their dreams and aspirations. This is one of the fastest ways for the students at the different sites (which are separated by half a state!) to get to know each other. It helps them realize how similar they are to their counterparts on the other USC campus.

Figure 2—Student Home Pages



Figures 3a, b display the Staff information section, where both Susan and Steve are listed.

Figure 3a—Staff Information

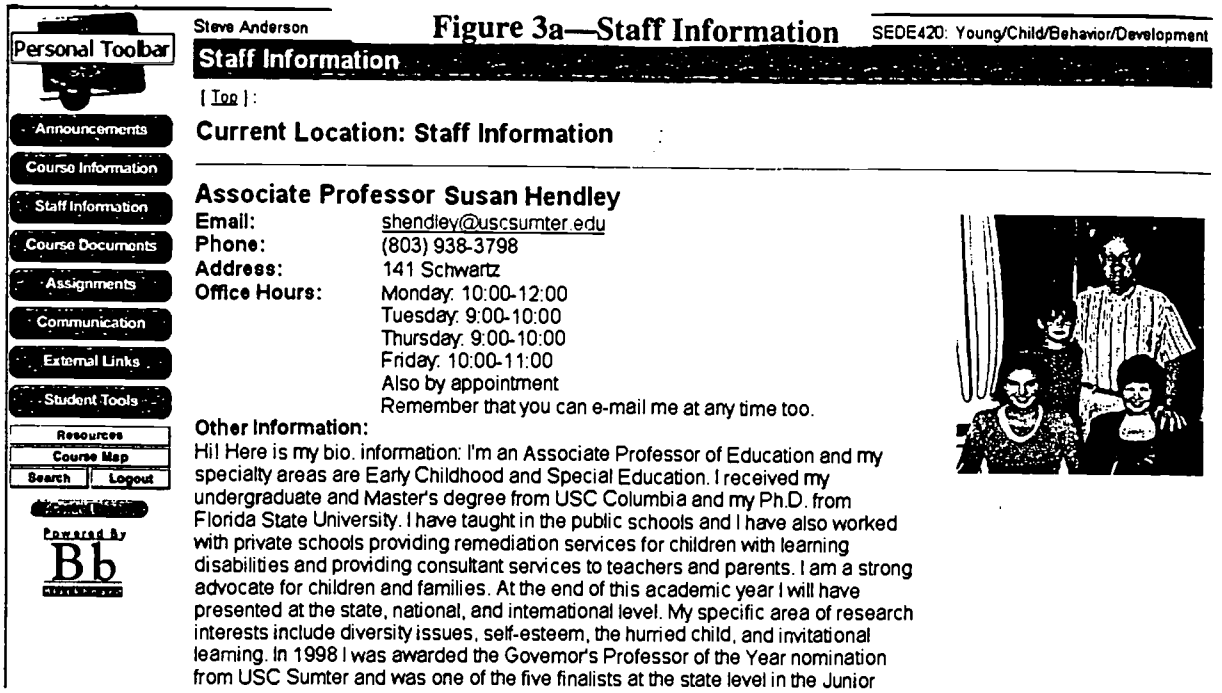


Figure 3b—Staff Information

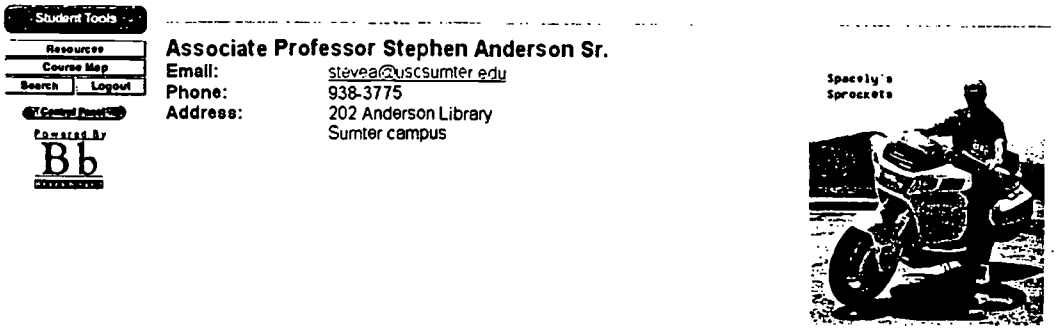


Figure 4—Course Documents

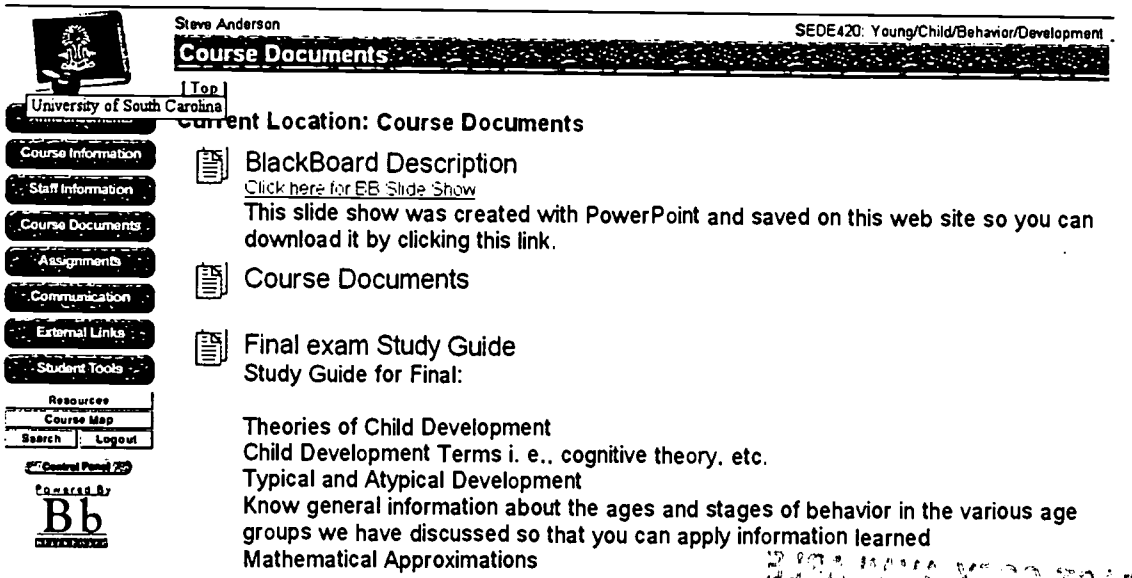
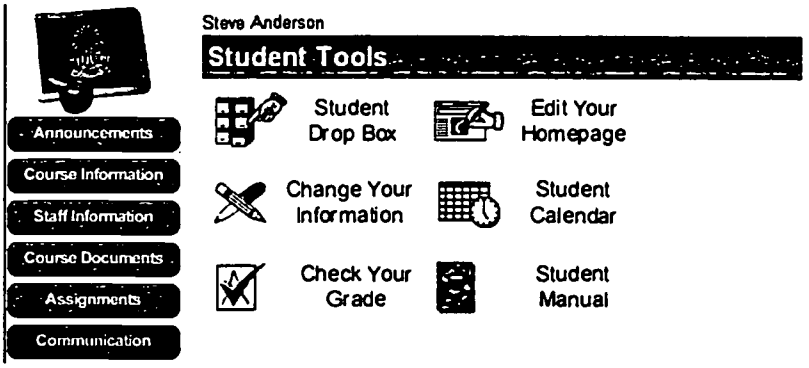


Figure 5 shows the Student Tools section that contains a calendar for posting course activities, an electronic drop box for submitting assignments and the ability for students to check their grade

Figure 5—Student Tools



Summary

Within two years of the inception of this rather unpopular approach to offering our Education curriculum, the courses have been transformed into exciting and popular courses for both students and the majority of the professors. We are proceeding to cautiously encourage other faculty to embrace the video and on line technologies as vast opportunities for building a community of scholars, separated by geography, but unified in purpose. The students have reacted positively to their experiences the second year and the professors are increasing their on line prowess daily. As for Susan and Steve, they have built collaboration both in the classroom and in the world of scholarly activity. This interdisciplinary union would have been hard pressed to occur had they not been thrown into the world of compressed video and on line technology. They both look forward to learning more about the best way to implement all available technologies and techniques for increasing the feeling of community among out geographically dispersed student body.

A Conceptual Model For Delivering Quality Distance Education

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Distance education technology is evolving and exponential gains in technology continue to create increasing opportunities for innovation. To that end, the suggested model reflects the current state of affairs. However, what is current today, is obsolete tomorrow. Obviously a need for a conceptual model that withstands the changes in the technology, economy, and environment is highly suggested. Further, the conceptual approach to the model, in spite of the ever-changing elements of telecommunications, will still maintain its role as a solid basis for understanding the general requirements for meeting distance learning projects. The model is explained diagrammatically (see figure 1) and conceptually.

The Conceptual Approach

It was found in reviewing the literature on existing models for distance education that none of the existing models emphasized both telecommunications requirements and human supporting activities to carry out effective distance education programs. However, even though these models are incomplete, a new model can be created as a result of joining some of their strong features. What is needed is a model that assures the inclusion of both human support and the effective use of technology. The modified model will adopt the "Knowledge Transfer Model" suggested by Chute, Hancock & Balthazar, (1991) and the systematic approach discussed by Moore and Kearsley (1996).

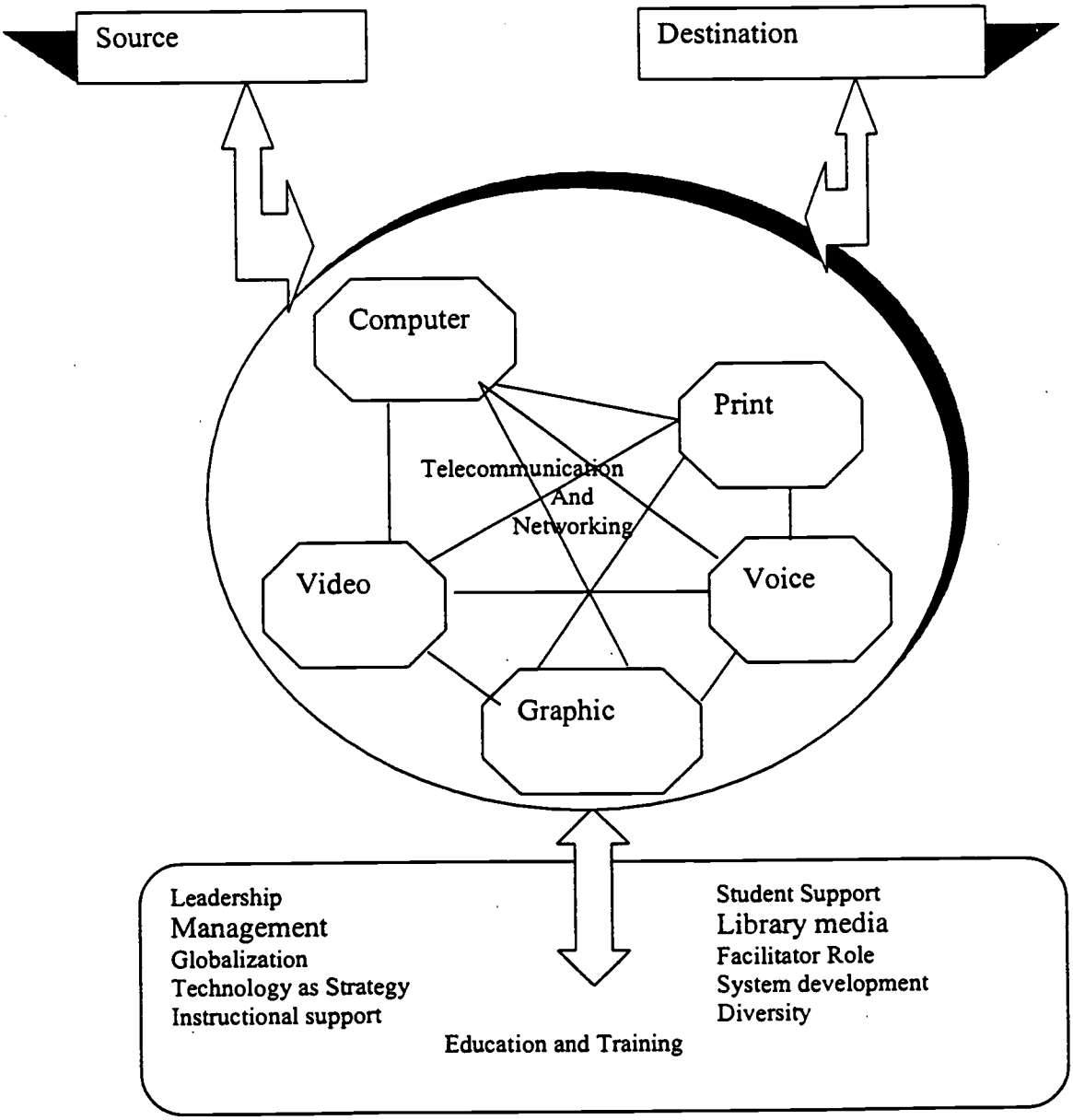
By adopting the Knowledge Transfer Model (KTM), the telecommunication and networking requirements will be met. Also, to assure the effective implementation of telecommunication and networks, the media of knowledge (computer, voice, video, print, and graphics) can provide the destination with the needed data and information.

By using the systematic approach suggested by Moore and Kearsley, the new model will assure that the message between the source and the destination is sent effectively. Since knowledge results from manipulation of information that is derived from processed data (Willimas, Sawyer, & Hutchinson, 1997), the new model replaces the word Knowledge with the term Information, which is used by Chute et al., 1991 in naming the Knowledge Transfer Model. Thus, the new model will be called Systematic Information Transfer Model (SITM). It must be noted that the new model will use its own approach in dealing with factors that are external to the model's telecommunications and networking aspects.

The Diagrammatic Approach

Figure one depicts the new model (Systematic Information Transfer Model). The figure combines the telecommunication requirements and the systematic approach.

Figure 1



The Systematic Information Transfer Model (SITM) focuses on three issues: first is the informational media; second are the telecommunication and networking technologies; and, third are the external activities to the model.

The informational media

The informational media covers five sources of information and they are computers, print, video, voice, and graphics. Also, it must be noted that these media will be linked through telecommunication and networks.

Computers: In the article "Computers in distance education," Gottschalk (1995) noted that personal computers and secondary storage have advanced significantly. This progress has made personal computers an ideal tool in distance learning. In addition, the author suggested that computer applications in distance education could be classified into four forms: THREE WERE SELECTED FOR THE MODEL.

1. Computer Assisted Instruction (CAI) which uses self-teaching methods by providing specific lessons to the learners.

2. Computer-Based Communication (CMC) which deals with the ability of students to communicate with other students or instructors by using E-mail, bulletin board systems, and computer conferencing.

3. Computer-Based Multimedia (CBM) which uses advance features such as HyperCard, and Hypermedia in distance education. The aim of computer-based multimedia is to combine different elements such as video, voice, and computer into one unit for easy access.

Voice: In the article "What is Teleconferencing" from the Distance Learning Resource Network, the researcher stated that teleconference link tow parties in dispersed geographical areas by voice only. In a distance education setting, teleconference enables groups of people to attend a class and interact together. Contrary to the previous definition, Moore and Kearsley (1996) stated that teleconferencing does not only include audio only, but that there were three other forms of teleconferencing: audiographics, video, and computer conferencing. The authors referred to audioconferencing as the most affordable form of teleconferencing.

Video: Hakes, Cochenour, Rezabek, and Sachs (1995) describe video as "the picture portion of a televised presentation" (p.1). Further, they defined compressed video as "a technology that enables live, two-way auditory and visual signals to be transmitted simultaneously among sites that are equipped with specialized equipment" (p. 1). The compression process averts the redundant data from being transmitted, thus accelerating the transmission time. According to the Hakes et al., there are three types of videoconferencing: compressed video, full motion video, and fully interactive video. They further state that videoconferencing technology offers interactive teaching with comparable results to the face-to-face teaching environment. The findings also indicate that videoconferencing is effective and efficient in distance education and through the use of it, an expert can teach one course to multiple sites. Videoconferencing covers multiple classes where there are few students enrolled and helps to avoid class cancellation. Further, they added that videoconferencing can be

efficient by reducing the cost of travel and other administration requirements which results in wasted resources.

Print: Keegan (1986) notes that print has been used as the delivery method in correspondence courses for the last hundred years. In the article "Print in Distance Education," by Gottschalk (1995) notes that print is considered the basis of distance education from which all other forms of delivery have emerged. The author noted that print is spontaneous, non-intimidating, easy to use, easily reviewed and referenced, cost effective, and time-effective. On the other hand, Gottschalk added that print's limitations could be found in its inability to view reality, passivity, lack of interaction, and reading skill requirements.

Graphics: Bass (1997) discussed the use of Whiteboards software. Whiteboard software provides the instructor and students the technology to explain an idea graphically with the combination of voice or picture. Moore and Kearsley (1996) stated that the "electronic blackboard" could be used to transmit text and graphics to a television and/or a monitor.

Telecommunications and networking needs

The exponential explosion in the computing world has brought the power of the mainframe computer onto the learner's desktop (Stair, 1997). Learners can, more than any time before, use software applications that were once only available to large organizations (J. Lever, personal communication, 1996). These may include the power of word-processing, spreadsheet, database management, desktop publishing, drafting, graphics and others.

The previous section discussed media that provides and/or stores data and information in different forms. However, a linkage is needed to assure the informational flow between the learner and instructor. There are a variety of approaches to which telecommunication and networking technology can be used to connect the media in the model. There are three additional aspects that must be considered in the model: communication channels, networks, and the Internet.

Communication channels: Beyda (1996) stated that the speed of transmission is determined by bandwidth. Bandwidth is the carrying capacity of a communication channel. Further, there are two types of communication channels: bounded channels and unbounded channels. Bounded channels are twisted pair cables, coaxial cables, and fiber optics. Unbounded

Networking: There are three important aspects of networking and distance learning: Forms of networking, general requirements for building a network, and distributed databases.

Forms of networks: As was found in the literature review, Markwood (1994) stated that "networking makes computerized distance education increasingly attractive" (p. 200). Computer networking required at least two computers that are connected through a communication channel. Further, there are two types of computer networks: Local area network (LAN), and wide area network (WAN). If two or more computers are connected within a campus or a building through "permanent wire," the formed network is a LAN. On the other hand, if computers are connected through telephone circuits, satellite, or microwave, then the resulted network is a WAN, covering a large geographical area.

In referring to Ranenbaum, Markwood (1994) stated that there are four reasons to set up a computer network. These include:

1. Sharing hardware and software resources.
2. Reliability through repetition.
3. Decentralizing computers operation.
4. Providing communication among people located at remote areas.

Further, these applications can be applied to distance education, especially to connect people at dispersed areas. The author added that students attend schools for the purpose of communicating with instructors; networking technology provides this option without requiring the student to be physically present on campus.

Requirements for building a network: In the article "Network Construction Parts," the author stated that there are hundreds of different part specifications in the network industry. Further, a person can determine which part to use based on its function rather that its physical specification. For example, a computer could be used as a transceiver, as a router, or as standalone computing machine. The author added that there are four main parts used in building a network. These include computers, communication channels, transceivers, and routers. Computers are networked together and considered as clients. Communication channels are the wires that connect the clients together. Transceivers are boxes in which the wires of two or more networks are attached to form a larger network.

Distributed database. As was found in the literature review, McGreal (1995) stated that information accessed by instructors, students, and administrators could not be located physically in one database. Further, networking should be designed to allow access to multiple formats of data. A distributed database uses network capabilities to provide users with informational needs over large geographical area. McGreal added that local and global access to the database should be "transparent" to the users. It must be a good network design which makes users feel that they are using a local database, no matter where it is located. The author referred to "Report on Replacement" by noting that networks' design should provide a gateway (router) to different databases.

In referring to Garcia-Molina and Lindsay, McGreal stated a "distance education network needs a distributed database systems that will allow autonomous access by the network users to the different types of databases that are in existence" (p. 30). In addition, an effective distributed database should have the following:

1. Global access to network users regardless of their locations.
2. Sophisticated features such as browsing capability for easy access.
3. Effective interface to provide users with the ability to combine different databases.
4. Maintainable and allow the access of graphics, software, and textual data.
5. Integrated and secured, however, the database should have the capabilities of searching, changing, and creating data by using "call-up procedures."
6. Provide user-friendly management system software.

Internet and the WWW as links and teaching tools: Since the release of the Web browser software, the number of people who access the World Wide Web has increased exponentially. Phelps (1997) stated that in "1993 the Mosaic Web browser was released, gaining 2 million users and fueling at

341,000% annual growth rate for the Web traffic" (p. 11). Reasons for the widespread use of the Internet include affordable hardware components and cheap prices for access time (Williams et al.).

One of the basic requirements for distance training is having access to a personal computer, modem, communication software, and a phone line. A learner may have to search the available options to access the Internet. Basically educational institutions provide students and learners with Internet access (Williams et al. 1997). However, if this is not an option, there are other affordable sources. These include online services such American Online or CompuServe, and many other Internet service providers. Also, Rogerson (1995) studied the instructional roles of the Fax machine and E-mail systems. The author found that E-mail systems encourage communication and discussions between individuals.

External Factors of the Model

In the article "Need Analysis for Electronically Mediated Learning" from the Distance Learning Resource Network (DLRN), the author stated that research showed that there is a need for an integrated program that includes many factors. Technology by itself is not adequate to assure the success of a distance education program. The human components and support services are essential in the process of maintaining those technologies to ensure that they are assimilated correctly. In the article "Distance Education: An Overview," Gottschalk (1995) stated that even though technology is a major factor to the success of a distance education program, educators must focus on the quality of instruction. As a result of brainstorm session, the researcher and students in the System Analysis Class, 1997 concluded that several external factors were important. These include leadership, management, globalization, technology as strategy, system development approach, education and training, diversity, student support, facilitator role, the role of library media, and instructional design, development, and support.

Leadership: Institutions using this model should provide leadership in the activities involved to meet the requirements of a successful project. To accomplish the task of leadership, educational institutions and organizations dealing with this model must integrate and sort their different functions, and form a committee to select the right employees for the project (Core and Stuble, 1994). These activities are met through research to fill the necessary positions, such as:

1. Supervision positions.
2. Marketing positions.
3. System developments.
4. Programming and technical applications.
5. Scientific information retrieval as a foundation for research and development.

Management: The educational institution or organization should encourage management diversities by allowing the application of management concepts on a project-by-project basis instead of adapting a rigid or specific structure (Ames, personal communication, Jan. 4, 1997). The open management concept should accomplish the following:

1. Build trust among employees.
2. Eliminate unneeded bureaucratic process.
3. Avoid wasted time and resources.
4. Encourage creativity.

5. Assure harmony among the different types of workers in the organization.
6. Provide a compensation system based on the degree of involvement and creativity rather than using a pre-set compensation form.
7. Prevent the building of logical and physical barriers that limit the level of communications among faculty, staff, and students.
8. Attend seminars and workshops to investigate the latest workable styles in similar institutions.

Education and Training: This goal should be important because of the continuous changes in technology. Colleges and organizations should advocate distance education and its output as a legitimate and valid means to deliver quality education (Lever, personal communication, May. 24, 1996). To accomplish this goal, the following objectives are necessary:

1. Create a plan that determines the market need, and promotes the program through marketing and advertising, and other tools to relay the message to industry and potential clients.
2. Create a plan to use the existing and available technology such as the Internet and its different subsets (WWW, FTP, Usenet, and Telnet) to provide quick and affordable methods that send the message to the masses.
3. Promote the concepts and practices of distance education and the ability to provide solutions to problems associated with traditional training and education.
4. Establish connections to other organizations and institutions to allow the institution to share the latest discoveries in the field of distance training-education.
5. Keep current with research, publications, books, and seminars.
6. Monitor rules and agendas released by government and policy makers on distance education and examine how these rules might affect the distance training- education.

Technology as Strategy: This goal provides the tools that deliver quality distance education. As a vehicle to deliver the desired education/training, technology must be used to build the most reliable systems. For this goal to succeed, the following objectives must be achieved:

1. In comparison to other changes in other organizational divisions, strategic planners should examine the change rate in technology carefully (Tallman, personal communication, April. 10, 1998). Tallman added that the rapid changes in technology might create a negative impact. Therefore, a full understanding of how to avoid conflicting issues is highly recommended.
2. Technological applications must allow for future expansion because the field is ever changing.
3. Theoretical and conceptual approaches should be considered regardless of which technology is used to deliver the education-training (J. Wood, personal communication, April 4, 1997)
4. The benefit of the selected technology should be obvious to the end-users whether they are students in a higher education institutions or employees in a company.
5. Exploration of all the technological application to select the most appropriate technology for a specific project is recommended highly.

Globalization: Institutions must realize that globalization is a reality. The employees or staff should be familiar with global economic theory and practices (P. Bernard, personal communication, July 11, 1996). To accomplish this goal, the following objectives should be considered:

1. By using affordable means such as the World Wide Web, marketing, management, and administration should monitor the competition's activities in this field.

2. Global competition should be based on an open and honest approach. For the educational system to succeed internationally, a quick reaction to the market demand should be a high priority.
3. Training companies and educational institutions should consider sharing and exchanging ideas and concepts with other international organizations or colleges to enrich their diversity goals and challenge the employee's or student's thinking processes.
4. Organizations and institutions should realize that the telecommunication industry has brought the world together, and competition should be taken seriously (Parker, 1996).

Diversity: Sanchez (1995) stated that serious demographics change has created a multicultural setting in education and in the workplace. In addition, diversity in hardware and software has its advantages. This will avoid the dependency on software and/or hardware vendor (Parker, 1996). Colleges and organizations must include diversity in all the elements of the model. To accomplish this goal, the following objectives should be achieved:

1. Human diversity should be implemented by including all manners of employees. This is the main source of innovation and creativity.
2. Hardware diversity should be implemented by avoiding the continuous use of specific hardware platforms.
3. Software diversity should be considered since no software companies can accommodate all the learners' requirements.

System Development Approach: Companies and institutions should provide quality service through the development of the educational/training system. This goal is accomplished through the following objectives:

1. The planning process should examine each system as being unique.
2. The preliminary investigation should accurately represent the views of those individuals who will use the system.
3. The analysis phase should include the requirements of users, management, administration, and individuals that will be affected by the system.
4. The design process should include qualified technicians who have both creativity and the technological qualifications.
5. The development and building phases should be consistent with previous phases to assure that the system users will not deal with unclear concepts.
6. The maintenance and troubleshooting phases should be well defined by providing manuals, help menus, and expert support.
7. The system documentation should limit heavy jargon and technical explanation to avoid user frustration and confusion.
8. The overall system should ensure the user's full satisfaction (Shelly, Cashman, & Adamski, 1995).

Instructional Design, Development, and Support: Preston (1990) stated that instructional design has been linked to instructional technology. The author stated that the instructional design concentrates on the product generally. However, both instructional design and development require other steps. The author provided the following list:

1. "Needs assessment."
2. "Task analysis."

3. "Learner characteristics."
4. "Message design."
5. "Product development."
6. "Motivational strategies."

In addition to the points mentioned above, instructor's support should be added to instructional design and development. Instructors work best when they are motivated, rewarded (financially and morally), and encouraged to apply instructional technology to their classroom activities (Lever, Personal Communication, Jul. 11, 1996)

Student Support: The authors (Eisenberg & Doug, 1996) listed the computer competencies for "information problem-solving." The pertinent points to distance education were selected from the authors' list. The students should know how to:

1. Use E-mail systems and access online discussion groups on the Internet.
2. Search the Internet for information retrieval to assist them in problem solving.
3. Use desktop GroupWare, conferencing, and E-mail to brainstorm with other students on the LAN.
4. Appreciate the value of informational media such as CD-ROM, databases, and electronic references.
5. Understand elementary computer terms.
6. Understand the overall impact of information technology on the future jobs, culture, and society.

The Role for Distance Education Facilitators: Hiemstra (1997) discussed the role of facilitators in computerized distance education, focusing on Computer Mediated Conferencing (CMC). The author covered all the activities required by a distance education facilitator; however, some points of the list can be applied to the role of facilitator regardless of the application. The selected points are:

1. Facilitators should provide help to energize students while activities are taking place.
2. Facilitators should advise students on issues such as appropriate communication skills.
3. Facilitators should manage the information to be accessed by learners.
4. Facilitators need to provide students with continuous training.

The Role for Library Media Specialists: Schamber (1990) referred to the article "Information Power: Guidelines for School Library Media Programs," 1988, by stating that the library's mission must include the support of students and college employees to be effective users of informational media. The author gave four elements as a challenge to library specialists:

1. Facilitate physical access to informational media for people with diverse backgrounds in order to cope with change.
2. Provide fair and free access to resources and information to all students.
3. Provide expertise and leadership in instructional technology and electronic access to information.
4. Attempt to be proactive to nontraditional education (distance education) and networking to resources that are not available in the local library.

Conclusion

In conclusion, this Model will contribute to the evaluation of distance education by examining the technology used in delivering distance education. The reviewed literature should provide institutions with ideas and concepts of how other institutions deal with distance education. The modified model (Systematic Information Transfer Model) should add another approach to the use of technology and distance learning. The systematic approach to the model should provide administrators, instructors, and technicians with a conceptual and logical understanding of the requirements for building an effective distance education project. Further, developing concrete insight on distance learning will enable institutions to better balance their traditional on-sight program with non-traditional distance learning alternatives.

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Make a Splash with Flash

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Abstract

Do you want to add interactivity and animations to your Web pages without creating huge files and learning a complicated scripting language? Then Macromedia's Flash 4 may be for you.

We will demonstrate the basics of Macromedia Flash 4, a powerful set of tools for creating clear, fast, efficient, interactive graphics and animations for use on the Web. We will show you how to add sophisticated multimedia effects to your Webs. The demonstration will include: creating images with Flash drawing tools, creating frame by frame animations, using the timeline to animate images, creating a rollover button with changing graphics and sound, creating a movie clip, and interfacing Flash with HTML.

(This session will be a demonstration rather than a paper presentation.)

Using The Gear Machine (A Hypothetical Decimal Computer) in CS1

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Abstract

The beginning of the first core course for computer science majors is often a dry, awkward, disjointed presentation of computer terms and concepts. In his 1973 Introduction to Computer Science "CS1" textbook, C.W.Gear describes a hypothetical decimal computer along with its machine and assembly languages to help students understand how a computer works in a context they can easily understand. Chris Donaldson wrote a simulator for the Gear Machine as a student in this beginning course. Rick Huston uses the Gear Machine in teaching both the core course and an assembly language course. We will discuss the advantages of beginning the core course with an introduction to the Gear Machine and will introduce the machine language for the Gear Machine.

(Rick and Chris's paper was not available at the time the Proceedings went to press. They will supply copies of the paper at their talk or give a Web address at which it can be found)

Rethinking and Restructuring a Civilization and Culture Course: Balancing Risk with Success

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Abstract

Designed for a small liberal arts college where interest in internationalization has increased, the Spanish American Civilization and Culture curriculum must be restructured to present a spectrum of resources to students majoring in or combining Spanish with business, health sciences, study abroad, or pursuit of multinational careers.

Today a third year course no longer focuses on learning facts about Latin America or even on language use but involves a holistic approach in which authentic materials -- readings, visuals, music -- can be accessed by students through technology.

From a pedagogical point of view, we will address the implications and importance of academic, technological support, and options technology provides to deliver these essential materials.

Introduction - the instructor's perspective

The increasing interest in internationalization and global perspective in communications and economy have made it possible to re-examine the traditional curricula in different areas of study in higher education, especially at a liberal arts college. Among the courses that reflect the implications and complexity of teaching with a broader and more practical vision is a Spanish American Civilization and Culture course.

This course emphasizes the study of history and arts and is taught in the target language. Traditionally, Spanish majors and minors would take this course as part of the program requirements. Today, a Spanish American Civilization and Culture course is required for Latin American and Caribbean Studies majors and minors at many institutions or as an elective course for areas of study such as Anthropology or Political Sciences. This increasing demand for the study of the different aspects of Latin American Cultures from a more updated and interdisciplinary perspective creates the need for reevaluating the curriculum for this course.

This third year course, as it is described in the catalog, is very demanding because of the amount of content it purports to cover in just one semester: "A study of the history, geography, art, intellectual currents and social development in Latin America." The reality is that a Spanish American Civilization and Culture covers an extensive amount of material that no longer focuses merely on learning facts about Latin America or on language use.

Among the major challenges I faced in teaching this course in the past was that there was too much material to present in just one semester. Too often, trying to cover so much content, I would end up skipping over major geographic and cultural areas that should not be left out, e.g., Brazil, Central America or the Caribbean Region.

Thus, I needed to try a different approach to teaching the course, one that should involve a holistic approach in which authentic materials -- reading, visuals, music -- could be implemented. I believed that the problem of balancing the amount of material with a dynamic, more communicatively oriented approach might be solved using technology. New technological tools could offer more updated and interactive material to students and simultaneously foster a student-center learning environment more conducive to languages learning.

With this in mind, I applied for and received a project award through the faculty instructional technology support (FITS) program at DePauw University. This award, which was supported through a grant from the Andrew W. Mellon Foundation, provided me course release time, modest funding to purchase resources, and instructional technology training and support to help me carry out my project from start to finish. The experience of re-structuring the curriculum for a Spanish American Civilization and Culture class using technology impacted not only the content of it but also the methodology for teaching and learning. There were many risks in developing this course: The different language levels of the students, their ability to use technology, the resources at the institution, and the training and support needed for the instructor and the students.

Design, Implementation and Outcomes

We assembled a team of people who would collaborate throughout the project. Team members were assigned according to the role they would play: The instructor as a content expert, an instructional technologist as project facilitator and pedagogical consultant, and a student intern as production assistant and sounding board for testing new ideas.

Our first step was to review and identify the course objectives. Next, we studied feedback from students of past semesters. Using questionnaires sent through E-Mail, both senior and prospective students gave their opinions about the topics they were most interested to learn about, activities they wanted to perform and whether the course should be divided in two semesters.

From the students' point of view some of them agreed with the curriculum presented through the traditional description of the course, including the idea of having all the material in one semester: E.g., "I think it would be great if there was a class covering Latin American culture. It should cover each topic you mentioned...history, art, geography, philosophy, geography is very important too because so many people can't tell you where a given Latin American country is on a map." However, while most of the students wanted to learn about a variety of topics some expressed concern that they could

not take two semesters and they knew it was too much material to study in just one semester. Others were concerned because it would be the first advanced course they would take in which the target language was used exclusively for instruction and class activities. They felt that their oral or written skills were not to the level of the course load. Many suggested the use of multimedia to listen to music, use videos, interview people, and some even suggested to make trips to presentations or activities off campus.

In general most students agreed that they liked the interactive situations over class lectures: E.g., "I am not sure what types of activities I would like to see in a course like this, but I know I would not like to listen to lectures all day." "I like more interactive classes where the students are encouraged to participate. Otherwise, I feel like I'm being talked at, and I get bored and tired. Any types of activities that are interactive and keep students on their toes and up to date with the work have always worked for me."

After reading the student's suggestions and opinions, our next step was to identify the topics covered in the course and design instructional methods for presenting them. We decided to develop the following resources to support the course content:

- A web site including:
  - Content resources such as paintings, photographs, song lyrics, and links to other online Latin American resources
  - Assignments and course requirements information
  - An online forum for discussion among students outside of class time
  - A private area for each student for the instructor to post feedback and grades
- A printed course pack of readings
- A set of CDROMS with selected music

The readings for each chapter offered two perspectives about the history and culture: one through folklore and the other through the "official story." The first perspective was selected from indigenous, African, and common people narrative, and the second from historical facts traditionally taught in a Latin American study course. Particularly relevant was the opportunity to bring authentic material to the classroom and to compare and integrate visuals to create the contrast. For example, in a topic on the creation, students read a story by an indigenous group of Amazons and watched a video with a version of the same story by the Colombian storyteller Carolina Rueda. Then they compared the story with other groups in the New Continent, Indigenous or Afro-American, and contrasted it to beliefs in other parts of the world.

In other examples, students used the web to find examples on their own, watched video clips from movies where storytelling is an integral part of education, listened to popular music and analyzed lyrics. The use of the web allowed to us to foster a communicative-oriented approach where students were involved by writing and participation in class.

A cooperative learning environment was emphasized by having debates on a specific topic in class and by tasking students to create their own test using the web forum. The day of the review, students were divided in two groups. Each selected readings from the course pack or the web page, movies, videos and songs used for the chapters to construct questions for the exam. We then held a competition similar to "Jeopardy" to help the review the material. After class, students posted their question on the web forum. From those questions, 80% to 90% were selected for the test.

Another collaborative approach used in this course was to incorporate students' input in determining their own grade using a weekly self-evaluation system for participation in class. Since students were assigned different activities using different multimedia tools and to give presentations individually or in groups, there were topics to research, music to listen to, movies and video clips to watch, and a final project to complete. Most of these projects involved oral presentations and here, too, students participated in grading their own contribution to the class.

Throughout the project, we encouraged formative feedback from the students to cultivate a collaborative teaching and learning environment where students participated in planning and selecting material for the course as it progressed. We administered three formal evaluations from the students: one at the beginning of the course to determine their confidence with using technology, another during the middle of the semester to gather suggestions for changes in the class, and a final evaluation of the course. In each evaluation, they were asked to indicate how often and in what ways they used the web components of the class and how effective those activities were in their learning process.

In general, we found that many students were comfortable with technology because of their previous experience with it, while others were hesitant. The students were required to participate in discussion via the web forum and to perform some web-based research, and all did. But, in other venues, some students went beyond the required basics of technology use.

Reflections and lessons learned

After the experience of implementing technology in a Civilization and Culture class, the idea of teaching it without the use of the variety of resources available through technology would be incomprehensible to me. Still, the previous experience and confidence of the instructor using those tools should be the primary factor in selecting which ones to use. This would help avoid too much dependence on others to solve technical problems during class as well as an opportunity to work with students that have more experience using technology or want to experiment with new tools. Preparing for a class like this requires almost two preparations, because one should never depend entirely on different tools, and the use of visuals takes twice the time of a lecture class.

Although the evaluations were generally positive this course, it was very demanding to implement and to teach. When using technology in teaching, one must remember that having the equipment and the resources does not mean that everything will work perfectly at all times, so planning activities in case of contingencies is critical.

The course web site offered several links to information related to topics at other sites, but these presented so many choices for the students that they did not use them as we expected. In the next

iteration of the course, it might work better to present fewer of these links and engage students more in searching for resources on their own.

The movies required in the course were played over the campus cable television during non-class times. However, we learned that students often worked on other things while they watched the videos and did not pay close attention to the videos. Thus, in the next iteration it might be more effective to show movies in class since it would help focus students on the video as well as provide opportunities to review and discuss different language or cultural clips relevant to the course.

Lastly, changing the activities and assignments from class to class was a challenge because the first version of the web-based syllabus was not designed for flexibility. Once we revised that page to allow it to be more easily changed, this problem was resolved. Through this we realized it is important to consider such issues earlier on when designing a course where flexibility is a key protocol.

The experience with this class indicates clearly that the amount of material must be reduced to fit into one semester. If possible, it would be best to continue it across two semesters. Traditional literature probably could be omitted since there are more courses that cover that area later on in a student's program of study. Instead, I believe this course offers an opportunity to present more popular culture and other areas of study that are not covered in other courses such as Afro-Latino presence or Brazil. Finally, the most important reason for taking the risk to develop this technology-enhanced course was not only to capitalize on diverse learning styles but also to expose students to more authentic material and new possibilities. Even though the course was not perfect, we believe those goals were achieved and that was the real success.

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A Method to Help Students Design Programs

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Abstract:

The process of learning to write a computer program is difficult, and students need all the help they can get. One method used by professional programmers is a "structured walkthrough" of code in front of other programmers. I have instituted a similar process in my programming classes for the last 4 years. I asked the students to perform a top-down design on the problem I gave them, usually generating pseudocode of some form. This design is then read and reviewed by other students in the class. In some classes I also review the design at this stage, but no grading as such is done; although feedback is always given. The results have been varied but generally positive for students and for myself. In this paper I show the forms I use and an example of the process, I discuss some reasons why I think the results are positive, and I comment on the possible future use of my method.

The Programming Process

One of the purposes of a Computer Science curriculum is to teach students how to write a program, a set of instructions that a computer can follow to perform a useful task. Writing correct programs is not an easy activity. It involves knowing how the instructions affect the computer (how they change memory or send things to output, for example), how the instructions are spelled and punctuated (syntax), and perhaps most difficult of all, how to express a problem in such a way that it can be written using these instructions. Designing a solution to a problem is similar to writing the outline for an English essay. It should be done early in the process; it should be given a good deal of thought and revision; it guides the later phases and determines the quality of the result.

Most introductory level programming texts list as the stages of program development:
* understand the problem,
* **design the solution,**
* code the solution (implementation),
* test and debug the solution,
* document
* maintain

Design is usually done in a different language or style than the final program, just as an outline is different from the final essay paper. Program designs have been written with flowcharts or other graphical design tools; a very common method these days is to use "pseudocode", a mixture of English statements and statements that are similar to the computer language that will eventually be used for the code. Software development companies may establish a standard style for pseudocode for their employees; in other situations, there are no strict rules for what a design should look like.

Unfortunately, students sometimes regard both designs and outlines as a waste of time. They enter a course with the habit of sitting down at a computer and throwing some code into an editor and then tweaking the code until it "works". Sometimes this technique is even successful in getting a program that will solve the problem, but it actually requires more work and usually results in lower quality programs, programs that are hard to understand, hard to debug and hard to modify and maintain. Teaching different habits, of doing a design first, testing it on paper before it gets "down to code", can be demanding. I present an example of design development with pseudocode in the Appendix.

What is a "structured walkthrough"?

Normally a structured walkthrough is done by a team of programmers working on a single project. (Weinberg) – the team meets at a designated time, one person at a time presents his or her design or pseudocode or code, and the other people on the team try to understand the logic behind it. The process can be very formal or very informal, involving high-powered visuals or just some paper and pencil work.

The goal of this meeting is to review or criticize the subject of discussion constructively, to discover if it is a logical solution to the problem, and sometimes to see if the presented material will work with other material developed by other people. The individual who is presenting the material is responsible for making the changes, if any, that the group decides are necessary.

Advantages of a Structured Walkthrough

A structured walkthrough encourages the idea that a program being written should be open to **everyone**. This attitude differs quite a bit from the attitude many programmers have both today and have had going all the way back to the beginnings of computer programming - programmers tend to "own" their programs, to have an emotional investment in their writing. It is not easy to convince them to display the design or code to other people, especially at preliminary stages. It is a natural human response; "it isn't **ready** yet!". But once people become accustomed to letting another programmer look at their work, it can become second nature to them. The idea of "egoless programming", that the programmer should allow or even request other programmers to criticize their work, is an ideal that should be striven for (Weinberg).

A structured walkthrough is yet another quality check (besides more formal ones) on a design and/or code. The more debugging and close scrutiny a program receives, the better. Programs do not **have** to have bugs, regardless of the current attitude most software companies seem to have towards their products!

If the programmer knows that other people will be looking at his or her work, he or she tends to try to write more clearly. Having to explain the logic to other people, rather than just to the compiler/computer, can sometimes clarify ideas and even discover mistakes.

Advantages of a Structured Walkthrough in an Academic Setting

Besides the advantages already listed, there are specific benefits for asking students to perform a structured walkthrough on their programming assignments. The structured walkthrough is a learning experience. If the student has trouble with the assignment, he or she knows there will be an opportunity to ask questions about it. Hopefully the questions will be more focused because they have been **working** on the problem in order to write a design (instead of ignoring it). And many students don't mind asking other students questions in a small group, whereas they feel they would "look stupid" if they brought the question up in front of the whole class. During the walkthrough, questions can be raised that are inspired by looking at someone else's design, questions that might never have occurred to them while working on their own. Even if the student doesn't have questions, the questions raised by other students looking at his or her design may show that he or she does not understand the problem. The student also sees many other solutions to the same problem, more of them than the instructor could present in the class time available.

Structured walkthroughs encourage more and better interaction between the instructor and students also. The instructor can pick up on a question being asked repeatedly in different groups as an indicator that some concept needs more work or explanation for the entire class. Or an instructor can work with a specific student with a specific weakness without feeling that the rest of the class is waiting (patiently or not).

These days it is absolutely necessary for programmers to have experience in teamwork. Most companies that generate software for internal or external use do so through programming projects. These require programmers to work together and to communicate with each other, with management and with users. Students gain some experience in teamwork through working with other students in a walkthrough, to understand a design or find its flaws.

Many beginning students tend to be unclear about the distinction between design and implementation. Requesting a design that is actually set down on paper can bring
complaints of "I can't get the program written that quickly, in one week!" This is the opportunity for the instructor to say "You don't have to have the program **coded**, just **designed**", emphasizing the difference between the two.

A structured walkthrough is useful for designs that are targeted at using **any** computer language for the implementation phase. The evaluation and criticism is of the logical design, not the syntax of the solution. So all kinds of classes can take advantage of walkthroughs, from the first class in programming through C++ or COBOL or Database Design to Compiler Design, as well as un-computer related classes. Something similar is done in many English Composition classes, for example.

For students of any discipline, writing and talking coherently and clearly are skills that have to be practiced to be developed to their full potential. Walkthroughs certainly provide practice in all of this.

My Situation

I teach computer science courses at Pikeville College, a small, private four-year liberal arts college. Several of the courses involve students writing programs, such as Principles of Computer Science I, Principles II, Data Structures, Assembly Language, or Compiler Design. Enrollment in the college varies from 700 to 900 students a semester, with computer science class sizes from 1 to 25. Over the last 5 years there have been three to four other instructors teaching at least one computer course. Most classes are 3 credit hours. The two Principles courses are 4 credit hours each, due to a 2.5 hour per week lab component.

When I started teaching programming, I tried various methods of assigning projects and getting feedback from the students (individual assignments, group projects, programs that were rewritten all semester, final projects, etc.). Programming assignments were given out with a deadline two to three weeks away. The students tended to procrastinate until the last minute to work on their assignments, resulting in very few questions being raised in class in a timely fashion. Consequently, programs turned in were commonly late, with penalties taken from the score, and not of good quality, causing more penalties. Sometimes they didn't even solve the problem specified because the student didn't understand some of the assignment or didn't take the time to solve the whole problem.

Conducting a Structured Walkthrough

In the Appendix, I provide the form that I use for structured walkthroughs. During a walkthrough, each student receives one of these forms, which is then attached to their design. Reviewers (other members of the team) write their comments either on the form or directly on the design.

I schedule a class day for the walkthrough at least a week in advance. Every student knows that his or her design should be substantially done by that date. If the class is large enough, I divide the students into groups of small size; three or four per group is about optimal. I usually try to vary the composition of the groups from one walkthrough to the next. The assigned teams meet and review their designs during this class time. This is **not** a group project. Each student is responsible for developing his or her own design and bringing it to the walkthrough class.

I have tried different methods of presentation - having each student taking a turn to orally describe how his design "works", or having the students trading designs on paper and reading them. The other students ask questions as needed. They do not try to **compare** designs, but to answer the question of whether the programmer has designed a correct solution to the problem, They look at the structure of the program and ask questions such as "Is it logical, valid?" "Does the logic of each module do what it says?" After one member's design is reviewed, it is put away and the team looks at the next. The time taken can be from 15 minutes to half an hour each.

If problems are found, the team is **not** responsible for fixing them. It is up to the individual programmer to fix them. Ideally the team should meet again to see that the errors are corrected (Shelley and Cashman). It is not the function of the team to write the program for the student. After the walkthrough is finished, each student should take his or her design and individually fix whatever problems were found.

A well-done walkthrough entails a good deal of discussion. I monitor this discussion for recurring questions, common questions that can then be answered for the entire class but I do not do an evaluation of the student being reviewed. If a student is not participating, I note that and give some encouragement, sometimes subtle, sometimes otherwise for him or her to do so. I want to see how well the team is performing in their evaluation or criticism - did the team discover the errors in the program **before** it was coded?

Some problems that can occur with a Structured Walkthrough

"Students are not prepared for the SW" (Shelley and Cashman). Granted, there **is** some time pressure; anytime we give an assignment, we are pushing the student to perform. But this is certainly not as hard as the real world. They must take the deadline seriously as a part of their learning experience. One suggestion is to make the walkthrough part of the grade of the program, and the students lose a letter grade if they are not prepared. I will admit that I have not usually been that draconian; my feeling is that even if they are not prepared as well as I would like, they will still learn something from reading and evaluating other designs; they can still participate in the walkthrough, but they are penalized in various ways.

A student who does not participate in finding errors can be a serious problem. I have tried giving a "team grade" that is based on the grades of all the team members. This does give each student a stake in making sure each one is working, although it does add to the complexity of grading a project. If a student does not contribute due to a poor attitude or lack of skill or a personality conflict, sometimes the best that can be done is to vary the teams from one assignment to another. Sometimes peer pressure can help.

If a student is absent from class on the scheduled walkthrough day, other members of team can work on each others' design, or they can be assigned to other teams temporarily. Ideally the team will meet outside of class to do the missing student's design. Often I will meet with the missing student individually at another time, just to see his or her design and give him or her **some** feedback on it. This is not a perfect substitute and there is usually a penalty of some kind, but it is better than no review at all.

Some teams of students want to compare designs, line by line, instead of considering each design as a whole, on its own merits. I emphasize that each design is independent, that just because they are different does not mean one is "wrong" or one is "right".

"I don't have to write out a design; I have it all in my head". This may indeed be true for some of the first assignments in a beginning class; it will quickly become untrue as the assignments become more complex and lengthy. This problem usually corrects itself over time; the student realizes that writing things down is one way to clarify one's thoughts.

Objections to doing Structured Walkthroughs

"There is not enough time in my course/in my job to do a structured walkthrough." Many companies do encourage or require a structured walkthrough to be done, sometimes even several at different phases of design and implementation. Students will be doing this kind of activity in the real world.

The more time spent on designing a good solution the less time spent coding and debugging later. The earlier a bug is found and removed, the less it costs in the long run. There **are** good reasons to make time to have the students get this experience.

"Students learn from making their own mistakes". That turns out to be true very often in the educational process. But students will learn more quickly if they have someone to point out some of their errors rather than not seeing mistakes until they are working with the compiler messages in the implementation phase. Many error messages can be cryptic, especially to beginning programmers. The all-purpose "syntax error" message is a recipe for frustration that can be prevented with a better design.

"Students don't know enough to criticize a program, especially beginners". In a team of students, what one doesn't know, another student might; their strengths can complement each other. And how else will they learn, both to read programs (Weinberg) and to evaluate programs, except by doing it? They quickly learn the value of proper indentation of pseudocode statements, for example. The review produced may not be of the highest quality, at least at first, but everyone has to start somewhere.

"Students don't want to be criticized". This is a perfectly normal reaction, but the instructor must emphasize the **program** is being evaluated, **not the programmer**. (Weinberg) Some students do not want to criticize other people's designs for fear of being criticized themselves. Again, the instructor must emphasize that the students are **helping** the member being evaluated by providing useful feedback. I instituted the rule for some classes that everyone **must** give at least one good point and one bad point about each design. This sometimes "breaks the ice" since they **have** to write something down and once pen is put to paper, it is easier to add other comments.

"Programming must be learned as an individual craft". This is generally true, and a walkthrough does not change that. Of course team programming is becoming more and more a fact of life for programmers, and a walkthrough is some preparation for that situation also. In industry, programmers who participate in walkthroughs learn concepts more quickly by reading the work of the more mature programmers in the same team.

Results of the Walkthrough Process

Does doing a structured walkthrough improve programming scores? I have not done any controlled experiments to test a question such as this. But my impressions have all been positive; missed assignment deadlines are less common and the quality of designs improves over the course of a student's career in our Computer Science program.

How do I benefit from the process? I get a look at students' thought processes earlier in the process than I might otherwise. This look can be very useful, especially when I can correct misunderstandings earlier than at the grading stage. I get a good deal more feedback in this somewhat more relaxed environment than in a standard lecture format, both about the specific assignment and about the students' styles of programming and problem solving.

The process can even reduce the problem of plagiarism somewhat. If two students present designs which are very similar, especially if one seems to understand the design and one doesn't, this similarity, at the very least, calls for closer scrutiny.

Student Comments

In the Appendix, I show the list of questions I asked both current and former students. I had written responses from about 20% of these students. There were some interesting comments - "I had to think like a "user" to see what another person's design would do, which helped me look at my design the same way". "It was always useful to see other people's designs, if only to see things that I wanted to **avoid**." Some students said that they hadn't changed anything in their designs because of someone else's work; some got lots of ideas from seeing it. Some enjoyed the "teaching" aspect of it; that is, they knew more than someone else and were able to explain it to them.

I had feedback from some students who said they automatically reached for paper and pencil when they got a new programming assignment instead of the keyboard. This reaction, admittedly, didn't happen in the majority of cases, but there was a group who really took the experience the way it was intended.

The Future of the Process in my Classes

Some changes I am considering:

1. Change the form to say "approved by " to emphasize that the whole team must approve of each design, that the whole team is responsible for each member's design.

2. Have the team members use different colored markers, so that it is easier to tell which reviewer made which comments. Also I am going to insist that the designs be typed; some handwritings are just not readable!

3. The class time taken by this is not a substantial portion of the whole course. Each instructor will have to decide what level of priority to give to walkthroughs. I am considering making the group size smaller in order to give the students more time per design reviewed. A negative comment I saw more than once was "not enough Time!"

4. The design itself is always part of the evaluation when the final program is graded. Should the design be given a grade at the walkthrough? Should the team's evaluation be given a grade? I have tried both ways, and I have not decided which way is more effective. No grading seems to give the students a feeling of freedom to be more negative in their comments; giving grades forces them to take the process a bit more seriously. Students who have some walkthrough experience tend to appreciate the usefulness of the process and treat it seriously regardless of grading.

Conclusion

I asked the students who gave me feedback if I should continue the process. The response was unanimously positive. Most students remembered the process as useful to their design process, and that is the best result I can ask for.

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Appendix

Example of Design Development using Pseudocode
Problem: to determine if a positive number is a prime or not

Level Zero (Top)
1. initialization
2. input number N
3. check all possible divisors of N to see if they divide N evenly or not
   and count the ones that do
4. if the count is more than 1 (not counting 1 but counting itself), then it is not prime
   otherwise it is prime

Level One:
1.1 initialize possible divisor D
1.2 initialize divisorcount
2.1 prompt for input
2.2 input N and check for valid format
3.1 repeat
3.2 generate a possible divisor D of N
3.3 if N is divisible by D, then
3.4 increment divisorcount by one
3.5 until all possible divisors of N have been generated and tested
4.1 if the divisorcount > 1 then output "not prime"
4.2 else output "prime"

Level Two:
1.1.1 initialize possible divisor D to 2
1.2.1 initialize divisorcount to 0

2.2.1 repeat
2.2.2 input N from keyboard
2.2.3 until N > 0

3.2.1 add 1 to divisor D
3.3.1 if N modulus D = 0
3.5.1 until D reaches the square root of N

Some statements are omitted from Level Two, if they are judged sufficiently simple to take directly to code in the target programming language. I prefer that students produce a design at about Level One as far as details are concerned; of course, I get all ranges from Level Zero to Level Two. Astute readers will note that this design can be improved in several ways, for example, checking for a divisor of 2 separately, then using only odd divisors (3, 5, 7, ...).

Walkthrough Form Version 1

Structured Walkthrough
Date _____
Names of Team Members reviewing
_____
_____
_____
Design done by _____

Does the design solve the problem, according to the given specifications? yes or no
Does it work correctly under all conditions? if not, when does it fail?
Is it clearly and logically written, with subprograms as appropriate to do logical tasks?

Describe the problem(s). Give details. This will not negatively affect the grade of the designer. It will help them find and fix errors!

Walkthrough Form Version 2

CS 350 Design Evaluation
Design was written by _____
Evaluators _____
_____
_____
_____
_____

Do NOT hesitate to make comments. You will be helping the writer; I do not use these in any way for grading. If the design is not clear, you MAY ask the designer questions.

Describe the problem(s)! Give details! This will help the designer find and fix errors!

1. Does it solve the problem? yes or no
2. Does it work correctly under all conditions? if not, when does it fail?
3. Is it clearly and logically written, with subprograms as appropriate to do logical tasks?

Questions I asked some current students and some former students:

Was the process useful to you?
Did you improve your design by looking at other people's?
Was there too much to read? too little?
Did your style of pseudocode change because you saw how other people did it?
Would you recommend that I keep doing it? how would you change the process?

Using Intelligent Agent Tutors

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Abstract

Intelligent agents are, in simplest terms, software programs built to perform certain specific tasks for the user. They are "autonomous" in the sense that they operate without specific user intervention. One form of intelligent agents, "chatterbots", is beginning to provide the capability to have intelligent tutors available to students at all times.

Many of these chatterbot software packages can be customized to provide content appropriate for individual lessons and can perform other tasks **automatically**, such as opening web pages, reading text, running other programs, answering questions and providing instruction. Further, they can even solicit information and distribute information. Several low-cost, easy-to-use packages have emerged, with useful features, such as anthropomorphic features and speech recognition. Soon, chatterbot agents will be providing useful information in many classrooms and over the web via distance education.

This presentation will showcase several of these packages, including examples of how they are being used and can be created. One agent, Sylvie, will assist in the presentation of material.

Introduction and Background

One of the most interesting, and potentially important, aspects of the information technology revolution might be the rapid integration of intelligent agent tutors into the classroom environment. "Intelligent software agents", also known as "knowbots" or just "bots" have recently become more than just a better way to search or to find bargains on the internet[3]. More and more these second and third generation agents are taking on aspects of human intelligence, allowing them to assist educators with classroom functions. More and more of these interactive anthropomorphic agents are beginning to actually provide instruction, explain answers, grade exams, answer questions, give references, provide underlying theoretical logic, link to websites, and, in general, guide and instruct students---all

[3] References and links to the intelligent agents mentioned in this paper and others can be found at http://www.botknowledge.com.

functions that until now were done by humans. The list of tasks that intelligent agents are already performing and might someday perform is rather extensive.

Intelligent agents (a.k.a. software agents and/or knowbots) are, in simplest terms, software programs built to autonomously perform certain specific tasks for the user. Intelligent Agents combine elements of Artificial Intelligence from other subsets (e.g., expert systems, object-oriented technology, neural networks, genetic algorithms, case-based reasoning, speech recognition, natural language processing, etc.) into an interface that has great applicability and appeal. Behind the agent front end is more often than not some simple rule-based programming which triggers actions when certain conditions are met. Some of the agents even have a crude capability to adjust their "reasoning" and "learn" from the user.

Current incarnations of intelligent agents can perform such useful tasks as retrieving information from the web, assisting in shopping for items by automatically finding the best price, monitoring auctions for specific items, gathering stock quotations and building customized newspapers. The latest generation of software agents moves closer to the ideal—an agent which can function autonomously to assist the user or the learner by providing help in dealing with what has become an information hyperabundance.

Today

Today, an important use of intelligent agents is providing features that can guide, advise, teach, critique and explain in an intelligent tutor or classroom instructor role. Although these early applications are often just prototypes, more importantly for educators is that the rapid development of intelligent agent tutors is becoming both a practicality and a necessity.

Being able to provide students with just-in-time learning, customized for what they need at the moment they need it is not possible with human instructors. The limited time and availability of human instructors means that more often than not instruction is provided at a level which accommodates the majority in mostly a same time, same place environment, but which is not tailored for each individual.

Soon, however, it will be possible to have a personal tutor for each student. This intelligent agent tutor will be customized to not only provide the instruction that the student seeks at the time he or she seeks it, but the tutor will do so in a very effective manner. Several low cost, easy-to-use packages have begun to emerge, with useful features, such as impressive anthropomorphic features and speech recognition. Indeed, they could soon even become mentors for faculty as well as tutors for students. An interesting example in development is the agent Virtual Steve that can provide tailored instruction for training.[4] Virtual Steve has a virtual reality front end and an intelligent agent engine combined with speech recognition and speech synthesis. Unattended Steve is able to guide students, react to their actions, correct them if they make a mistake and admonish them if they ignore procedures. Although only a research effort at the moment, Virtual Steve is an example of the type of customized personalized instruction that is possible with intelligent agent tutors.

[4] Virtual Steve can be found at: http://www.isi.edu/isd/VET/vet.html

Many of these new software packages can be customized to provide content appropriate for individual lessons and can perform other tasks **automatically**, such as opening web pages, reading text, running other programs and answering questions. Further, they can even solicit and distribute information. Already they can provide answers to questions, instruct on how to perform actions and provide feedback to queries. Soon, agents will be providing useful information in many classrooms and over the web via distance education. Providing these services in a 24/7 environment makes them an attractive method for the delivery of customized instruction.

Future

The future is even brighter for the use of intelligent software tutors. Recently, several articles have profiled the development of intelligent agent tutors, but few academics and faculty have begun to use them. For example, an article in the Jan/Feb 2000 issue of Educause Review by Alfred Bork gives a vision of providing instruction via intelligent computer tutors to everyone at an affordable cost.[5] The inexpensive use of software expert tutors means that superb instruction can be available at any time for anyone. Further, the instruction can be tailored to be different for every student. Just now beginning, the rise of intelligent agent tutors will become a flood as the technology matures. Their potential to provide valuable assistance not only in the traditional classroom but also over the web (e.g., distance education) is tremendous.

As the technology rapidly matures, the limiting factor will no longer be the technology itself, but the development of a new paradigm for teaching. Instead of "one size fits all" lectures, for example, lectures will be customized for each student and provide information at a pace appropriate for each student. This mass customization feature has been taking place in other areas, but, so far, has been limited in education. Intelligent Agents will provide the means to have a personal tutor or instructor tailored for each student. Instead of having to rely on one instructor, students will have the ability to tap the information reservoir through their intelligent agents who can link to virtually all information. Instead of having to wait for feedback on an exam or private counseling session, students will instantly know what they have done right and wrong. Instead of having to meet at a particular time and place, students will be able to meet anywhere, anytime with their personal agent tutor and still enjoy the richness of a face-to-face session.

Additionally, there will be an increased growth in the ability of the agents to learn for themselves rather than being constantly reprogrammed with new information. Increasing ability to "learn" from experiences, increased improvements in anthropomorphic features, increased friendliness, increased ability to collaborate and increased ease-of-use will no doubt boost the use of intelligent classroom agents. Already, some collaborative agents which can meet and share information are beginning to emerge. Gossip, for example is one such collaborative agent which can meet with other agents with similar interests, exchange web links (gossip) and ideas and return more knowledgeable about a subject[6]. It is not much of a stretch to envision these agents acquiring additional knowledge on a particular subject of interest, incorporating this new knowledge into the subject matter database, and updating their material for lectures or presentation automatically!

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[5] Alfred Bork, "Learning Technology," in *Educause Review*, January/February, 2000, pp. 74-79, http://www.educause.edu/pub/er/erm00/erm001.html

[6] GOSSIP collaborative agent can be found at: http://www.tryllian.com/.

Summary

The development of intelligent agent tutors has begun and will continue at a rapid pace, greatly expanding the ability to provide excellent instruction, tailored specifically for individuals at any place and time. Continued technology improvements will make the use of such "intelligent tutors" not only possible, but probable. Educational institutions will need to become involved with these developments since they will alter the way in which educational instruction is provided for many future students.

Bridging the Gaps: The CSI Meta-Learning Initiative

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In today's rapidly changing environment several emerging problems require attention. Three such problems are addressed here. We express the problems as gaps in the fabric of the campus community that technology can help bridge. Specifically, the gaps in question are, first, the growing tension between print and visual cultures. The second gap (which emerges directly from the first) is between the lagging technological competence of faculty and the demands of new programs and professions undergoing restructuring to remain current for the new age. Finally, the third issue is the potential of technology to create a virtual community on a campus where the traditional, face-to-face community is inadequate.

Perceiving Visual Culture

The extent and comprehensiveness of the emergent visual culture remains only dimly perceived by academia. Like much of the older generation generally, many senior faculty do not understand the digital culture. (Negroponte) While everyone is conscious of the growing role of television is our lives, many do not yet comprehend how television is merging with video, graphics, sound, and photography to create a new imaging system that is not static and one-way, but rather is dynamic and personalized, changing in ongoing interaction with the viewer. (Druckery; Holtzman)

This change is not minor; it is transforming our very culture and language. The transformation is not total and comprehensive however. Different ethnic and social groups feel the impact differently. (Warschauer) From our everyday language (and non-verbal communication) to our overarching myths and ideologies, new understandings and new literacies are required for effective living. (Silverblatt) For the educator this means that no one "literacy" will suffice. Multiple literacies must be the goal. A scaffolding of skills and understanding must be constructed, starting with "tool literacies." (computer and network literacy), and moving on to literacies of representation (information literacy, media literacy, and visual literacy). (Tyner)

In an additional effort to assist comprehension of the impact of this visual culture, we can utilize two suggestive metaphors. Steven Luban argues that we live in an information culture comprised of the information, communication, and entertainment that engulfs us. This new "information machine" shapes us as profoundly as does geography, ethnicity, or race, and the culture it is creating prefers speed, exactness, and novelty. (Luban) Steven Johnson suggests that architectural structures have often represented the public life and consciousness of an age. For example the Agora reflected the new public life of the Athenian polis. The Gothic cathedral expressed the spiritual aspirations of

medieval life. The edge-city mall expresses the auto-centered consumerism of our time. In like manner does the desktop PC gateway to the Internet represent the virtual realities and communities of the new digital, visual culture. (Johnson)

How can the college campus capture and support the learning of these new realities on the part of our students? We must redefine the literacies and basic competencies we require for the certifications reflected by our degrees. A literacy can be defined in many ways, as a technology, a technology of the intellect, as a discourse, or as an enabler for the use of information, logic, and creativity. (Tyner) Multiple definitions and competencies can be expected, but not necessarily the same set of literacies for all of our students. But certainly we must require much more extensive skills than those demanded for the reading, criticism, and writing of text. Multi-media workstations and labs must be provided, complete with access to the Internet and capabilities for manipulating, saving, and distributing the knowledge being cultivated and captured with the technology. CD-ROM/DVD printing will perhaps prove to be the most flexible and cost effective medium for these purposes, and we are experimenting with this technology in our library, media center, and computer laboratories at the College of Staten Island, CUNY (CSI).

Organizing, explaining, and providing access to our visual culture presents enormous new challenges for the academic library. Text "speaks for itself;" images require interpretation. While capturing, storing, retrieving, and distributing images is relatively easy, indexing and providing access to intellectual content is a much greater challenge. Iconography, pattern recognition, template matching, and spatial arrangements offer tools for discriminating between images, and librarians and information scientists are making great strides in spelling out standards for metadata descriptions of those images, sound bites, and continuous media content. (Sandore)

Technology Lag

Poor comprehension of today's visual culture contributes to a problem existing in many of our classrooms and programs. Some faculty have not taken up the new technologies. Most of our faculty received their graduate training before the Internet, and even before the PC, and many faculty remain wary of the new technologies. (Olsen) This presents several problems, particularly for academic libraries. In a time of constrained resources and enormous demands for technological upgrades, many faculty cling to their expectation of extensive provision of print journals, even though most research journals are rarely used outside of research libraries and doctoral-granting universities. Faculty remain blissfully unaware that the number of journals has jumped from about 20,000 (at an average cost of $7) thirty five years ago to more than 160,000 (averaging more than $200 per subscription) today. A typical college collection of 2,000 journals could capture a significant proportion of the intellectual mainstream in 1970; it cannot do so today. Research journals of interest to one or two scholars on a campus cannot be justified; collections must focus on those core journals of major influence and accessible language. Electronic access to research journal collections is the obvious and available solution to this problem, but some print journals may have to be cancelled to offset the costs. Journal cancellation is a dangerous enterprise for library directors. The economics of collection selection from among various media needs greater attention and cost-benefit analysis in our libraries and learning centers. (Meyer) Overcoming technology lags on the campus cannot be accomplished by any department acting alone. Comprehensive programs of faculty and staff development are required and must include technology, information, and economics lessons as well as literacy

instruction. Collaboration is required. Tompkins provides guidance on how teams (including faculty, librarians, technicians, multi-media specialists, and instructional designers) can facilitate collaborative, student-centered learning. (Tompkins)

Virtual Learning Community

Many academic institutions today serve as many or more non-traditional students as the conventional 18-22 year-olds. Current reports indicate that retention rates are sagging and completion times for degrees expanding as more students work to meet their many obligations. In the case of CSI, many faculty and staff live in several different cities and many students (who come from a wide range of cultural backgrounds) dash to the campus for class-time only. All this is troubling since it is clear that the personal interaction with faculty and fellow students is one of the most important components of the collegiate experience. (Boyer) Technological solutions offer some redress for this problem.

The heart of any community is shared experience. While there is little hope for widespread intensive, face-to-face experience at CSI, some measure of virtual community can be pursued. A deliberate effort to utilize college and library Web servers to announce speakers, concerts, presentations and meetings adds to the shared common information opportunities to supplement limited face-to-face contact on the campus. A growing number of Web-page servers is being implemented, moving beyond the Technology Services and Library departments into a number of academic departments, notably Education. An initiative to support Web-page development for all seniors has been projected as a means of promoting the visibility of our graduates as well as our campus.

A system of computer laboratories scattered across all classroom buildings, a media distribution system, and a technology-centered library form the core for widespread use of technology on the CSI campus. An experiment with information kiosks proved difficult to support, but the goal of easy access to information and resources remains a focal ideal for the campus.

There are reports that purposeful, mentored online dialogue can create an environment supporting effective teaching and learning. Online book chats, problem-solving exercises, and other collaborative knowledge-building experiences and conversations enhance shared learning experiences. (Sherry) Course management and other interactive software, continuous media management, and collaborative portals ratchet up the power of the Web and offer exciting new possibilities for bridging this gap. But someone must take the lead. On the CSI campus such initiatives are focused in the Faculty Center for Excellence in Media and Pedagogy. Consisting of a small lab with several workstations and an extensive array of software programs and hardware peripherals, this facility is the heart of a "meta-learning" initiative reaching across the library and the media center to heighten awareness, foster collaboration and experimentation, and encourage the use of technology for classroom instruction and student learning.

Conclusion

There is a new academic emphasis today as attention focuses on the learning process specifically. On the CSI campus the Library and the Media and Pedagogy Center (sometimes called the meta-learning center) are emerging as focal points for efforts to support this new strategy. In a visual culture it

makes sense to demonstrate the assumption that technology can be utilized to bridge gaps in the physical campus community.

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A WEB-Based Testing System for Introductory Mathematics Courses

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Abstract:

This paper discusses some of the issues involved in designing and developing a web-based system that supports skills testing and progress tracking in remedial and introductory mathematics courses. It augments the existing web-based system that provides practice problems for use in group activity sessions in an electronic classroom or provides the basis for individual study through internet access. The paper will focus on both the technical and the pedagogical aspects of the system.

In the Fall 1998, the author introduced a web-based system capable of presenting practice problems. The design goals of that system were: provide web accessibility for 3.0 or higher browsers, present in real-time the results or additions and deletions to the problem database, provide classification of problems by course and topic, provide for unlimited problem set size (within the context of human developed problem sets), and provide a system where adding and editing problem sets could be accomplished by users rather than system administrators or web developers. That system is currently being used in several courses at the University.

This paper discusses the newly developed companion system that provides testing and tracking of student progress. The system is called MUTester. The principal features of the system are: select a random set of test problems from a specified category, grade answers according to specific test guidelines, provide a student authentication mechanism, provide an audit trail of student test attempts, provide for dynamically extensible problem sets, and provide test specifications by individual student or by entire class.

The system is ideally suited to support a "go at your own rate" course (a PSI – Personalized System of Instruction – course of old). MUTester has been field tested for a couple of exam administrations during the Spring '00 term. The system will be used in the Fall term to support sections of Math050 – Pre-Algebra Mathematics in a "go at your own pace" mode.

Instructional Setting:

Monmouth University is a private, comprehensive, teaching university enrolling approximately 4500 students of which 3200 are full-time undergraduate students. The University is located in the central shore area of New Jersey – about 55 miles south of New York City.

The Mathematics Department has eleven full-time faculty members. The Mathematics Majors program at the University enrolls over 60 full-time equivalent students; a significant number of those students are dual-majors – mathematics and education. As with most institutions of today, a substantial part of the teaching responsibility of the Mathematics Department is directed toward

instruction for non-majors with many in the non-science disciplines. The largest single group serviced by the Department consists of those students majoring in programs within the Business School.

Like many (most) higher educations institutions of today, the University boasts of a wired campus. At Monmouth this includes connections to all campus buildings and to each room in the residence halls. At the present time, the University is completing a plan to wire all classrooms with video and data and to install computer-supported video display units that are connected to the campus network. There are currently 27 computer laboratory/classrooms and 25 classrooms with permanently installed video display units.

Problems Addressed:

From our experience, remedial mathematics courses, like our Math 050, require a lot of nurturing, one-on-one tutoring, wealth of practice problems, and frequent check-points. In addition, successful progression through the course and the acquisition of the skills is an individual characteristic -- they don't all move at the same rate.

Management of a testing process that provides instant feedback and historical progress tracking requires the existence of a structured computer database with appropriate software.

Most available systems that provide drill and practice problems are application oriented or local area network/server oriented. To access them, students need to be in specific locations that support the requisite software. However, this has been changing with the appearance of some commercial products that support web access.

Most available software packages have a fixed database of problems that are organized around a specific text.

Both students and instructors required access to progress tracking records.

Design Goals:

The basic design goals for the system were:

- Provide for web accessibility through Internet Explorer or Netscape 4.0 or higher browsers
- Support dynamic additions and deletions to the test set database
- Support a variety of modes at the problem presentation level
- Provide access to individual student progress records
- Support dynamic test creation from a problem set that can be assigned to a given student or to an entire class
- Provide an authorization mechanism for test administration
- Support faculty level administration

Description of the System:

The MUTester system consists of two types of Access databases and a directory structure on a web server that contains the ancillary files and forms. One type of database, the problem set database,

organizes and controls access to the various problem sets while the other type, the testing database, controls the testing process and student records. The system runs under IIS 4.0 and uses some active server page technology to access the databases and files and to format the pages for presentation to the browser. In addition, a small amount of JavaScript is used at the presentation level on the client machine.

The html pages and forms have been designed to function with multiple problem databases. Thus, applications can be organized by topic or by administrative responsibility by creating different databases. No changes are required in any of the html pages or forms. The initial link includes the database name and ASP technologies connected to the appropriate database and present the first level of options to the user.

The current state of the art for presenting mathematical content on the web is still in its infancy. Creating XML mathematical documents and associated style sheets is not without pain. Even if it were easier, browser rendering is not without its share of problems. The use of proprietary systems with browser plug ins have their own problems. Faculty users of the system are not expected to have extensive skills for setting up their systems. Consequently, the current system is based upon a mixture of html text with embedded tags and individual graphic files to present the mathematical content. Any of the main data elements in the database can contain either html text or url links to either gif files or other html pages to be inserted in place. This permits a choice of the best of the two alternatives at any point.

Organization of Problem Sets:

The problem set component has basically two levels of organization. A typical application would be by course and then, within a course, by topic. In this scheme, each course would have a separate problem set database. A simple delegation of responsibility and accountability for maintaining a problem set database could be through the use of different course databases. There are no system limits on the number of problem set databases that can be accessed by the application software. Within each database, there are essentially no limits on the number of topics that could be supported. For all practical purposes, a single Access Database could support the number of topics and problems that could be reasonably associated with a single course or for multiple courses with similar themes.

There are no constraints on the number of problems that can be associated with a single topic. The system is dynamic so that problems can be added to and deleted from a topic at anytime.

A given category of problems may or may not be a basis for the Testing Component. If the category is intended only as on-line practice, then any number of problems would be appropriate. However, if the category will be a basis for a the Testing Component, then the number of problems should be 3 to 4 times the anticipated number of problems that will be selected for a specific test. Since the tests are randomly generated from the problem set, 3 to 4 times the number of problems will provide some degree of comfort that a given student will not be presented with the same test the second time around.

Organization of Testing Component:

The main components are students and tests. These components are organized by class. A given course may have multiple sections -- multiple classes. A student may be a member of more than one class. Each class has a collection of associated tests. Students in a given class may or may not be eligible to sit for a specific test associated with that class. Eligibility to sit for a specific test can be set for the entire class or on a student-by-student basis. A specific test for a class may be based upon any category in any problem set database. Thus, a single problem set category can be used as a basis for a test in any number of classes, whether they are different sections of the same course or not.

Problem Set Database Description:

This database contains three tables. A small table that keeps a count of the number of times the initial screen is downloaded to a client browser. That count estimates the number of users that access the system. The second table contains information on the various problem classifications for that database application. These problem classifications form the basis for a specific test. It has a field that identifies the classification by name and a second field for instructions on the category of problems. This second field is of variable length and provides instructions to the user as to the goal of a specific set of problems. Each category of problems can contain a link to a fully worked-out sample problem. The third field in this table contains the link to the sample problem.

The main table coordinates the necessary information for each problem. In particular, the table contains a link to the classification table that identifies the problem type. It contains fields that form a link to the gif file for the problem or text and html tags that display the problem. Along with a problem link, there are fields for links for the five possible answers. These fields can also be either gif links or text and html tags. Finally, the table contains five "memo" fields where comments are inserted for each of the possible answers. These comments are displayed when the problem set is used in the practice session mode.

Organization of the Testing Component Database:

The testing component database contains six basic tables: authorization table, student name table, course table, exam header table, student exam header table, and student-to-course cross reference table.

The authorization table provides testing security. Students must be authorized before they can sit for an exam. That is, verification that the student is who he or she says they are. Since the system permits testing at any time and any place, this mechanism permits the delegation to testing monitors.

The student name table contains student names and ids. A student need only be entered into the system once.

The course table contains the course name, term, and instructor. The student-to-course cross reference table links students to courses. A student can be linked to more than one course.

The exam header table contains information about a specific test. Each test has a test name, link to the course, the number of questions on the test, the number required to pass the test, the database name, and the category within the database that will provide the test questions.

The student exam header table contains data on the results of a specific test. Each record in the table contains a link to the corresponding student in the student table, a link to the exam header table identifying the specific exam, the date the test was taken, the number of questions answered correctly, and the indication on whether the student successfully passed the exam.

Requirements for creating an application database:

A template database exists for both the problem set database and the testing database. To set up a new application, the template databases are copied to an appropriate directory that may or may not be the same directory as the application html and asp files. A System DSN must be given to each of the databases so that they can be accessed through an ODBC connection in the html files.

The system html and asp files can be placed in any virtual directory on the web server. The only requirement is that if the application will be using gif or link text files that are to be part of the problem presentation, they must be placed in a separate directory, called problems, at the same level as the home directory for the application.

Resources Required for On-going System Administration:

There is almost no on-going administration required. As mentioned above, the only system administration is registering a new database with a System DSN name. At the present time, the problem set database is maintained through an Access database form directly in Access. There are no web tools to maintain that component. However, the testing database component has an extensive set of web-based forms that can maintain the various components of the system.

Fall '00:

Math 050, a remedial course in mathematics, will be offered using the supporting technology. In addition to the technology described in this paper, the course will be supported by an extensive set of on-line notes. With the use of the supporting technology, the course will be offered in "progress at your own rate" format. This is the PSI (personalized system of instruction), also called the Keller Plan, of the 70s. In those days, the most difficult part of the course was managing the testing and tracking of student progress. The author taught several courses in the PSI mode during the early 1970s and became disillusioned, not with the concept but, with the overwhelming amount of time and effort that went into the management part of the process.

In the PSI mode, there will be no class lectures as such. The instructor and peer tutors will be available for individual assistance during the scheduled class meeting times. The scheduled class meetings will be held in the thirty-station mathematics computer laboratory. During those times, students may seek individual help from the instructor or peer tutors, work in small groups to prepare for a specific quiz, test their skills level with the on-line practice problems, or sit for a quiz.

Students are required to pass the course with a grade of C before they can continue with other mathematics courses as required for their major. The credits and grade do not count toward their graduation requirements. The grades in the PSI course will be assigned on the number of modules (tests) successfully completed. A minimum number will be required to be assigned a passing grade. That minimum number will include all the requisite material for the course.

Current Problems:

At the present time, there are no significant problems with the system. It meets the objective of providing a source of practice problems integrated into a testing and tracking system that can be accessed through the Internet. It functions with both of the popular browsers.

Future:

The main thought with regard to the future is transitioning to some of the emerging technologies that will support the presentation of mathematical content on the web. It seems likely that in the near future, we will have a broader support base for MathML. One that will support the development of content as well as one that will support browser rendering with a minimum of user effort.

Conclusion and Recommendations:

It is relatively simple to develop content. What is needed are some basic skills in working with forms in an Access database, in fundamental directory administraton on a PC, in creating and saving gif files, and in creating small ancillary html files that could server as text for word problems. The content of MUTester is accessible from any modern browser with Internet connections.

Attachments:

Attached are four screen shots from MUTester. The first, Screen 3, presents the student with a choice of pending examinations and a summary of the completed ones. The second, Screen 5, provides the student with the problem statement (as selected from the list of problems for the specific examination). The student is expected to select and answer and present the submit button to submit the selected answer. The third, Screen 7, presents a summary of selected answers and provides an opportunity to submit the selections for grading. Any time before submitting the selections for grading, a student may reselect and problem and change the answer selection. The fourth, Screen 8, provides the student with a summary of the grading process. It presents the outcome for each problem, the total score, the passing score, and an indication on whether or not the student successfully passed the examination.

Reference:

R. Kuntz; *Lessons Learned Preparing On-Line Class Notes*, International Conference on Technology in Collegiate Mathematics, November 1996

____; *A Web-Based System to Support Practice Problems in the Classroom*, International Conference on Technology in Collegiate Mathematics (ICTCM), November 1999

-- Screen 3 --

Monmouth University
Mathematics Department

Student Find Screen

Enter Last Name and Press 'Enter'

Last Name: B

Jennifer Brady
When you are ready to take an on-line examination, click on the name.

Pending Examinations

Exam Name	Course	Term	Instructor
Q1	m05002	Spr00	Kuntz
Q2	m05002	Spr00	Kuntz

Jennifer Brady -- 304137
Enter Authorization Number and Press 'Enter'

Authorization:

Completed Examinations

Exam Name	Completed	Status	Score	Course	Term	Instructor
Q1	3/8/00		1	m05002	Spr00	Kuntz
Q2	3/14/00		0	m05002	Spr00	Kuntz
Q1	3/14/00		1	m05002	Spr00	Kuntz
Q1	3/14/00		1	m05002	Spr00	Kuntz
Q2	3/14/00		0	m05002	Spr00	Kuntz

--Screen 5 --

Monmouth University
Mathematics Department

Jennifer Brady
Q1 -- m05002 - Spr00 - Kuntz

Select a Problem

(1) Reduce to lowest terms: 12/18
(2) Change to improper fraction: 6 5/6
(3) Change to improper fraction: 7 3/11
(4) Add: 2/3 + 7/12
(5) Subtract: 5/7 - 2/7
(6) Subtract: 2/3 - 1/4
(7) Multiply: 2/3 X 3/5
(8) Multiply: 5/7 X 3/4
(9) Multiply: 5 X 2/7
(10) Multiply: 1/6 X 3/11

You have selected (c) please confirm and SUBMIT your answer.

Reduce to lowest terms: 12/18

Click the box corresponding to your answer.

(a) 1/4
(b) 3/5
(c) 2/3
(d) 1/6
(e) None of the above

■Screen 7 --

Monmouth University
Mathematics Department

Jennifer Brady
Q1 -- m05002 - Spr00 - Kuntz

Select a Problem
(1) Reduce to lowest terms: 12/18
(2) Change to improper fraction: 6 5/6
(3) Change to improper fraction: 7 3/11
(4) Add: 2/3 + 7/12
(5) Subtract: 5/7 - 2/7
(6) Subtract: 2/3 - 1/4
(7) Multiply: 2/3 X 3/5
(8) Multiply: 5/7 X 3/4
(9) Multiply: 5 X 2/7
(10) Multiply: 1/6 X 3/11

Select another problem (by clicking of the appropriate number) or SUBMIT for grading

Summary of Selected Answers

This is a list of your selected answers. The number 0 indicates you have not selected an answer for that particular problem.

Beore selecting the SUBMIT option above, you may go back and change any of your answers.

(1) -- c
(2) -- 0
(3) -- 0
(4) -- 0
(5) -- 0
(6) -- 0
(7) -- 0
(8) -- 0
(9) -- 0
(10) -- 0

-- Screen 8 --

Monmouth University
Mathematics Department

Jennifer Brady
Q1 -- m05002 - Spr00 - Kuntz

Select a Problem
(1) Reduce to lowest terms: 12/18
(2) Change to improper fraction: 6 5/6
(3) Change to improper fraction: 7 3/11
(4) Add: 2/3 + 7/12
(5) Subtract: 5/7 - 2/7
(6) Subtract: 2/3 - 1/4
(7) Multiply: 2/3 X 3/5
(8) Multiply: 5/7 X 3/4
(9) Multiply: 5 X 2/7
(10) Multiply: 1/6 X 3/11

Summary of Answers by Question

Problem	Your Answer	Correct Answer
1	c	c
2	e	e
3	c	c
4	e	a
5	a	a
6	c	c
7	0	e
8	b	b
9	d	d
10	b	b

Your total score is: 8
Passing score is: 8

Congratuations -- You Passed this Exam.

Your exam results have been entered and your session is complete. You will not be able to continue with the current session without encountering a system error.

Restart

How to Deploy a Video Streaming Application on the Web

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This presentation will highlight the system requirements to produce, maintain and play video streaming using Microsoft Media Server and Microsoft Internet Server. Applications for media streaming include presentations, recording class content, publishing on the web, distance learning, and training. We will present and demonstrate production of video content using desktop cameras, conversion to the streaming format, adding markers to control web page content and publishing the end product to the web server. Performance options will be presented comparing video compression, bandwidth and clarity. This session will also discuss the tools used to integrate the media streaming format into desktop applications like FrontPage and PowerPoint making it easier to train faculty and other users to produce the content. Use video streaming to promote your school and programs. Seeing is believing. . .

(Dave's paper was not available at the time the Proceedings went to press. He will supply copies of the paper at his talk or give a web address at which it can be found).

Ubiquitous Technology in the Undergraduate Curriculum: Preparing our Students for Tomorrow[1]

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Longwood College, founded in 1839 as a female normal school in the Commonwealth of Virginia, is located in Farmville, With an enrollment of approximately 3,700 students. Longwood is state assisted and awards undergraduate and masters degrees. The College has a long and revered tradition of preparing teachers for the K-12 school districts in the state. My relationship with the College started in 1989 as a trainer of foreign language teachers. I still remember being confronted by one principal in a large urban school district and being asked why Longwood does not train its student teachers how to integrate technology into the curriculum. I returned to my campus determined to assist the institution in bringing about the necessary change so that our students graduate not as users of technology but as state leaders in the integration of appropriate technologies into the K-12 curriculum.

In 1995 I was appointed to my current position, charged with infusing technology into the curriculum of this institution of higher education. The College was very clear with its mandate. I was presented with several goals and with the administration and interested faculty, we proceeded to change the undergraduate experience. The goals were clear but simple:

1) Technology was to permeate every aspect of the educational experience.
2) Each student and faculty member was to have access to the latest technology appropriate for the curriculum and the learning experience.
3) Each student and faculty member was to meet high levels of technological ability and understanding.
4) Technological competencies were to include proficiency in basic computer skills and in-depth, discipline-specific technology applications.
5) The Institution would guarantee that every Longwood graduate would be technologically competent.

In order to understand where the Institution is today and how it got there, it is best to examine where Longwood College was, technologically, in 1995. Longwood was typical of most institutions of higher education in the mid nineties. Five years ago, Longwood College maintained its own digital telephone system with voice mail for most all users. This was perhaps the most sophisticated piece of technology on campus, having replaced a system that would go down with every thunderstorm that rolled through Southside Virginia. All student and financial records were stored on a large IBM mainframe located in the Computer Operations Center in the Information Technology building. The College maintained three PC computer labs for the students. These labs were, in large part, open

access labs as the faculty had virtually little to no training in the use of computers in instruction. The technology Helpdesk was virtually helpless, generally giving the sage advice of "reboot your computer" for each call for help. Classrooms were equipped with chalk, blackboards, and overhead projectors. "High tech" meant the occasional opaque projector stored in a closet "down the hall". With a full time faculty of approximately 145, there were very few computers in faculty offices. The Institution recognized that an integrated campus-wide approach was needed if the students were to be prepared for the technology of tomorrow. We were not doing our job!

Ubiquitous technology at Longwood had two components: student technology and instructional technology. The new Director of Instructional Technology (myself) and the Vice President of Academic Affairs and the Vice President of Information Technology had several meetings to map out a road that would be used by the Institution. In order to do this, task forces were assembled to map out plan goals and lay the foundation for institutional change.

The first area planned was the student technology piece of the initiative. The goal was to ensure that all students were prepared to enter today's workforce with a high degree of technology skills. This was to be accomplished in several ways. The first element of this goal ensures that the use of technology starts before the student ever arrives on campus. The College application for admission is web-based. In addition, at Orientation, all placement and assessment examinations are computerized. Again, the Institution wanted technology learning to be a Freshman to Graduate experience. Longwood was committed to provide the technology infrastructure and support for students throughout their academic careers at the Institution. Finally, the College wanted to provide a variety of technology learning experiences in the undergraduate and graduate curricula. Perhaps the most important concept was that while the Institution desired to infuse technology into the curriculum, it was committed to having the pedagogy drive the technology, and not the reverse.

The second element of this technology infusion was in instructional technology. The faculty had to be committed to this process if they were to succeed. Faculty "buy-in" would come if faculty had the correct tools for the job. Longwood realized very quickly that

- Faculty would need the appropriate technology tools for teaching.
- Faculty would need assistance in coming up to speed with technology.
- The classroom infrastructure would need to be modified so that faculty would have the technology tools in the classrooms.

Finally, the entire initiative would need to be driven by assessment.

Student Technology:

In 1997, The College examined the use of computers by students. Computer use was restricted to the Academic Computing labs on campus and the myriad of pc's and Macs that the students brought with them each semester. This resulted in approximately one personal computer for every 21 students on campus. Students were constantly complaining that there were not enough computers at the College. In addition, the variety of personal computers that students brought to campus posed a support nightmare for the Information Technology staff. Farmville is the only shopping community in a 7 county area and personal computer repair and support are important concerns.

The President of Longwood College appointed a task force to examine this issue and make a recommendation. This task force included Vice Presidents, Deans, the Director of Instructional Technology Services, Faculty, Staff, and Students. The ultimate recommendation was to issue a Request for Proposals to find a computer vendor, and to require students to purchase a computer. All issues were weighed including:

- Price of computers: The last thing the Institution wanted to do was create yet another financial hardship for the students. And yet, with a state-wide freeze on tuition and fees, Longwood recognized that raising tuition was not possible.
- Learning styles of students: Students rarely confine themselves to the residence halls when studying. They go to the library, lounges, classrooms and even return home. Did we want to confine them to using a cumbersome desktop computer?
- Wiring in the residence halls: If we required students to bring a desk top, wiring issues become paramount. Go into a typical student room in a dorm and you will find refrigerators, microwave ovens, VCR's, televisions, hair dryers, stereos as well as personal computers and laser jet printers. It is easy to understand that wiring (and potentially electrical fires) is a key issue. And the last thing that the institution wanted to undertake was rewiring the residence halls for a computer initiative.
- Computers in classes: Some faculty wanted students to bring a computer to class. A desktop was now out of the question.

At the time that this task force started to meet, laptop computers were still in the $3,000 price range- a range considered out of the question by the task force. But while the task force met to hammer out these issues, prices for laptops started to plummet. The task force finally recommended that a vendor be located through the RFP process and that incoming freshmen be required to purchase a laptop before starting their undergraduate careers. The remaining concern was the effect that this requirement would have on enrollment. The Director of Admissions worried that enrollment would drop. In fact, the reverse came true.

The lengthy RFP process located a vendor. Dell Computer Corporation was chosen, and students were notified in bulk mailings prior to the Summer Orientation. Students were able to purchase computers over the telephone or the Web prior to Preview (Orientation) or at special ordering sessions during Orientation.

Requiring laptops is just the beginning of the initiative. If a student has a pc, they need access to servers and the Internet. The Institution immediately started re-wiring the residence halls with a new high speed data network, guaranteeing a port per pillow ratio. In addition, network jacks were placed in the Library, the Student Union, classrooms, informal study spaces and the new Dining Hall.

Prior to 1998, Longwood was primarily a residential college with few students living off campus. Because the College is committed to growth, the Institution recognized that students living off campus would need access to the same technology tools as on-campus students. Two apartment complexes were constructed in Farmville in the last two years. The College worked with the contractors and the owners and put T-1 lines into the complexes and networked all the apartments in each complex. Students electing to live off campus were therefore guaranteed high speed network access at no additional charge.

In the first year of the computer initiative, students were required to bring a pc to campus. The Institution did not require a laptop because many students (as high school seniors) already had been given computers the Christmas prior to their arrival on campus as Freshmen. Most students, however, elected to purchase a Dell Latitude laptop. The next issue that the Institution faced was support. With the influx of more than 800 additional personal computers on campus, support was critical. The College tackled this challenge in several ways:

- The RFP required a three year, next business day, on-site warranty/repair service. Dell contracted these services to two companies that came to campus when needed.
- The College required in the RFP that for every 500 laptops sold, Dell would supply the Institution with three laptops. These laptops were kept at the Helpdesk and were part of a loaner pool used if a student machine could not be repaired immediately.
- Dell trained three Longwood technicians in Dell Premier Access level 1 service. These technicians were able to by pass the first line of Dell telephone support because of their training.
- The College created the Residence Technology Associates (RTA) program. These RTA's were students recommended by the faculty. Often they came from the Computer Science program in Liberal Arts and Sciences, or the Computer Information Management Systems major in the School of Business and Economics. Other majors such as French were also represented. The 15 RTA's were assigned to the residence halls and provided technology support when the Helpdesk was closed (after 6:00 PM weekdays and on week-ends). The RTA's also provided training for the students. Workshops in "Laptop Care and Feeding" "Internet Ethics", and "The Use of E-mail" were conducted by the RTA's throughout the academic year. RTA's are compensated with free room and board for their service to the Institution.
- The College also created a Student Networking and Computer Repair Center. Two full time technicians were hired. These technicians are also Dell certified.

In addition, the College provided internship programs as part of the student technology initiative. Internships are provided each semester in Information and Instructional Technology Services. These internships expose students to the essentials of user support, networking, instructional technology, and information technology security.

Longwood also provides students with space on one of the College's web servers. While the Institution is not a complete ISP, the College does provide each student with four megabytes of web space for their personal use. In addition, the College's Strategic Plan requires that all students have a web-based portfolio of their work for prospective employers. Finally, for the incoming freshmen of the Fall of 2000, there is a computer competency graduation requirement. The Institution recently signed a three-year contract with Smartforce (formerly called CBT). The College purchased computer-based training titles that students will use to become proficient in word processing, spreadsheets, presentation graphics, e-mail, and use of the Web. Each module has a pre-test and a post test so that the Institution can track student progress in technology.

The second area in this initiative was the instructional side. The Institution has maintained a computer on every faculty desk since 1995. This includes a refresh program and a network connection for each faculty member. The College also created the Instructional Technology Teaching and Learning

program (ITTL) led by the Director of Instructional Technology Services. The ITTL program was charged with faculty/staff development in technology. The ITTL customer base included approximately 550 full time faculty and staff and an additional 60 adjunct faculty. Training programs were designed in such software packages as Microsoft Office (Word, Excel, Access, Powerpoint), HTML, Netscape Composer, Frontpage 2000, and graphics packages including Adobe Photoshop and Corel Photopaint. Faculty and staff were also taught how to digitize audio and video, scan documents and photographs, and create PDF files. Faculty and staff used this knowledge to place coursework on line and to automate office procedures such as travel authorizations.

In addition, the ITTL program ran a series of mini-grant competitions. These competitions were designed to place high-end software and equipment into faculty hands so that more of the curriculum could incorporate appropriate technology. This was especially important for faculty desiring to retool summer school classes. Any money the Institution earns from summer school enrollment does not have to be turned back to the State (unlike monies accrued during the academic year). The incentive for the latest mini grant competition was to create on-line courses that students could take from home during the summer. Faculty also competed for reassign time, so that with a one course reduction during a semester, they could devote more time to infusing technology into the curriculum. Faculty also submitted proposals for off-site training. One faculty member was recently sent to Michigan Tech for training in the use of computers in the teaching of writing, for example.

The College was also committed to changing the use of technology in classrooms. Currently 30% of all applicable classrooms are multimedia equipped. Instructor consoles include a high-speed pentium computer with Internet access, software including Microsoft Office 2000 and Frontpage 2000, and any discipline-specific software needed for instruction (TurboTax for example). The Institution has as a goal that 98% of all classrooms will be multimedia-capable by the end of the 2001-2002 biennium. The College has completed renovation of the School of Business and Economics facility as well as having constructed a new School of Education and Human Services building. These buildings include four state-of-the-art classrooms with power and data ports at each student desk. Longwood is also renovating the largest academic building in the School of Liberal Arts and Sciences. This facility will also have two academic computer labs (used primarily for instruction) and at least one laptop classroom. The College is currently in the planning stages for a new science center and for the renovation of the building housing the Theater and Communications programs. In each construction or renovation, technology planning is of prime importance. In order to support this classroom technology the College has hired one classroom technician for every 30 classrooms.

Longwood has just recently conducted a national search of an Instructional Design and Development specialist. This staff member will assist the faculty with training. In addition, the Design specialist will oversee a new program at Longwood-the Instructional Technology Associates (ITA) program. The ITA's collaborate with faculty in infusing technology into the curriculum. Faculty are pressed for time. Recognizing that they are the content experts, the ITTL program supplies an ITA to faculty desiring to work with a student who has technology skills. Collaborating as a team, the faculty members and the ITA's are an integral part of this technology initiative at the College. As with the RTA's, the ITA's are compensated with free room and board for their efforts.

Longwood College is committed to assessing the effects and the validity of technology in the curriculum. The Director of Assessment uses various surveys such as the national Campus Computing

Project survey to examine how Longwood students compare with benchmark and other institutions. The results prove that the institution has made the correct choices in its initiative. 94% of the faculty require students to use computers outside of the classroom. 85% of the faculty require students to use the web. 64% of the faculty use the web in conjunction with classes. This last statistic will change dramatically in the 2000-2001 academic year. Longwood has just signed a contract with Blackboard.com and will use CourseInfo, Blackboard's web based course management software, to deliver web-based instruction.

Assessment of the Longwood technology initiative demonstrates that Longwood Seniors (a class ***without*** a computer requirement) use technology significantly more than Seniors in national benchmark groups. 37% of Longwood Seniors participated in class discussions using an electronic medium as compared to 19% of students at peer institutions.

Did the Institution make the correct decision? The answer is unequivocally yes. Our application rate is up. Perhaps the best indicator of success is with our graduating students. Longwood College has the highest non-military job placement rate in the Commonwealth of Virginia. Recently I went on the road again to observe student teachers. I was back in an urban high school and yet again, I was dismayed. After observing my student teacher I was forced to ask the cooperating teacher a key question. "Why is I that your institution does not have the appropriate technology so that my student teacher can do the job better?"

EndNote:

[1] This paper is based on several presentations made in the last two years. the vice President for Information Technology, the Vice President for Academic Affairs, the Director of Instructional Technology Services, and the Director of Assessment and Institutional research have discussed the Longwood College Technology Initiative at the AIR Conference in Seattle, the AAHE Conference in Washington, D.C., and the Dell/UCF Conference in Orlando.

The CROW Project: Directing Faculty to Course-specific Teaching Resources on the Web

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"Water, water, everywhere, nor any drop to drink."
Samuel Taylor Coleridge, The Rime of the Ancient Mariner

The Problem

I do not find that many faculty are very resistant to technology anymore, but I do find that many are not yet ready to embrace it. One reason for their reluctance, as I discussed in my presentation last year, is that some faculty are resentful or suspicious of the suggestion that they "need" to infuse technology into their teaching. The implication to them is that something is wrong with their teaching. On the contrary, many faculty feel they are doing a good job in the classroom and nothing needs to be "transformed."

So, at North Central, we often present technology in the context of enhancing what faculty already do well. For example, as I presented last year, we share with faculty ways technology can be used in the lecture-oriented or the discussion-oriented or the problem/project-oriented classrooms. Then we provide training and development for those technologies that faculty identify they would like to try.

Of course, the most substantial obstacle to integrating technology into teaching is time. It is our most precious resource, and we do not want to waste it. So, even if faculty identify a technology that could enhance their teaching and student learning and are willing to consider it, they still may stop short because they do not believe they have the time to meaningfully incorporate it into their pedagogy.

An excellent example of a technological resource waiting to be used is the World Wide Web. On the one hand, the Web is one of the easiest technologies to use. On the other hand, the hundreds of millions of pages on the Web is an imposing sea of resources. Many faculty who try surfing the Web often drown in it.

A good deal of order has come to the Web. Many, many individuals, often volunteers, have made attempts to organize the Web's resources into relevant sets of links for particular audiences or topics. Although the cataloging is not nearly as complete or systematic as that of a library, there now exists "megasites" for virtually every discipline or sub-discipline to which faculty belong. A megasite usually contains a large number of sometimes-annotated, sometimes-categorized links to topic-specific resources.

It is not difficult to find a megasite in one's discipline as these sites are often cross-linked with other similar resources, can be located in search engines and are often reported in discipline print publications. However, even those of us who know how to look for things on the Web can spend an inordinate amount of time wading through the megasites. First, many of these sites are simply long list of links with little annotation or organization (e.g., http://swix.ch/clan/ks/CPSP24.htm). Second, despite the long list of links, these sites are rarely comprehensive, ignoring a considerable number of valuable sites. For volunteers, categorizing and annotating most of the relevant links to a topic and then updating the list is also a daunting task. Finally, most megasites do not have a single audience in mind, so they often do not serve any audience as effectively as they could.

For example, my field, social psychology, is fortunate to have one of the most comprehensive, well-organized, well-maintained megasites (The Social Psychology Network) among academic sites. The Social Psychology Network (SPN; http://www.socialpsychology.org) contains links to over 5000 resources, is sponsored by major organizations within the field, and is scrupulously maintained by Scott Plous. However, the site serves multiple audiences: Researchers, teachers, students, department chairs, organization members, etc. Consequently, links and annotation are not designed with one audience in mind. Moreover, the sheer number of links makes it difficult for the webmaster to provide very detailed annotation.

As an instructor of social psychology, that means that I still have to wade through a large number of links to find one or two useful teaching resources. The amount of time that requires makes it prohibitive for many faculty even though they know valuable resources are out there. Personally, I would like someone to wade through all the sites for me, find the good stuff, and present it to me in a well-organized, well-annotated manner.

Getting CROW off the Ground

That is how the CROW (Course Resources On the Web) Project got its start. I belong to the Technology Planning Committee of the Associated Colleges of Illinois (ACI). We were looking for additional ways our schools could collaborate. I noticed that there are approximately the same number of schools in the ACI as there are disciplines at each of the schools. So, I suggested that each school take a discipline and create a set of web pages for a few core courses within the discipline (that are common to all our schools) that direct faculty teaching those courses to relevant resources on the Web. In other words, the website would be narrowly targeted to instructors of a specific course. Librarians have struggled with creating discipline-specific sets of links to web resources for all the disciplines at their respective schools. The division of labor across schools in this project makes it much more manageable with each participating school focusing on a single area. Furthermore, the development of links to teaching resources within a sub-discipline is a natural and exciting task on which librarians and faculty can collaborate.

To get the CROW Project off the ground, we submitted a proposal for funding of a pilot of the project. In the fall of 1999, we received a small grant from UPS to create three such course sites as a pilot. Currently, the three sites are located at:

- Social Psychology -- http://www.noctrl.edu/~ajomuel/crow
- Introduction to Literary Theory -- http://www.lfc.edu/crow

- American Literature -- http://www.millikin.edu/aci/crow

To allow for the most experimentation with the CROW concept, we permitted those working on each of the three sites to construct the site in whatever form they felt would be most useful, and to use whatever model of collaboration they wanted. As a result, we have three different sites created in three different ways. The Social Psychology site was developed by a single individual (myself). The Introduction to Literary Theory site was created in collaboration by a librarian, a faculty member and an IT person. The coordinator of the American Literature site is using external experts to create many of the annotated links to teaching resources within the field.

Taking a Tour

Because I created the Social Psychology site, I will take you through it to illustrate the concept we were after. But I encourage you to visit the other two sites to see what else is possible and to give the developers some feedback if you wish.

In web page development, the design of a good home page is one of the most important steps to a successful site. Visitors need to be able to quickly find what they are looking for through appropriate category headings and explanatory text. I spent a considerable amount of time contemplating the best layout and organization of the home page. I used other related sites, a review of the common categories that the links I found appeared to best fit, and my own assessment of what would best serve me as an instructor of social psychology to select the categorical links on the home page. I chose to keep the home page simple to make it quick-loading and easy to navigate. Similarly, I followed other web development advice to create a site that was accessible by different browsers and slower computers and would fit in most screen resolutions.

On the home page I created eight major categories of links:

- Class Assignments
- Activities and Exercises
- Online Lectures
- Online Studies/Demos
- Topic Resources
- Student Resources
- Technology in Teaching
- Courses/Sites on Web

Additionally, I included a link for visitors to submit other resources they feel might be good additions to the site. Their submissions keep me informed of many of the resources I might miss and distribute my work among a larger group of peers. Both are much appreciated!

Comparison to Megasites

To give you a little better sense of what I believe a site such as my Social Psychology site offers to instructors of social psychology, I will compare it to the more common megasites that also exist on the web. For example, another good social psychology megasite can be found at

http://miavx1.muohio.edu/~psy2cwis/webinfo.html. Imagine that you are an instructor of social psychology looking for some useful *teaching* resources on the Web. You might come to the Web with some of the following queries:

1) I am thinking of giving my students an assignment to keep a journal for the course. Have other teachers of social psychology used journals in their courses? If so, what requirements did they have for the students? How did they design the assignment?

2) I have my students do oral presentations but I am not happy with how I grade them. How do others grade them? Can I find examples of grading scales (rubrics)?

3) I want to do less lecturing in my classroom and engage the students more. Are there some good social psych exercises or activities that other teachers use to illustrate concepts or to get students involved in discussion or thinking about the material?

4) I am talking about topic X next week and I need some more/better examples of that concept.

5) I want my students to design and/or conduct a research project. How have others done this? To what sites could I point my students to help them get started with doing research, writing research papers in the proper format, etc.?

6) I would like to incorporate more technology into my teaching. What are some ways other social psych teachers are doing this? Has anyone already created and put on the Web PowerPoint slides and other resources so I don't have to recreate them?

7) I would like to send my students to some topic-related web sites to supplement my lectures/assignments, or I would like to bring up some topic-related websites in class to enhance lecture and discussion. Where are some good ones?

8) Are there any interactive demos or simulation sites that I can send my students to so they can actively learn about and review social psychology outside of class?

9) How have other social psych teachers organized their courses? Can I see what their class notes or outlines look like?

First, let's bring these questions to the megasite mentioned above. An instructor of social psychology will commonly find that the organization of links does not make it immediately apparent where to direct such questions. Additionally, if an appropriate link is found and followed, it often leads to another long set of links that all have to be visited to find one or two useful nuggets.

Now, let's bring these questions to the CROW site. No categorization will perfectly address all the questions a visitor has, and, of course, the above questions were generated by the same person that created the Social Psychology site. Nevertheless, I believe this site provides some easy-to-find and useful answers to the above questions in a length of time that many faculty will no longer find prohibitive.

Finally, let's return to the most comprehensive and best of the social psychology megasites -- the Social Psychology Network. Before April 2000 an instructor who visited the SPN would have had a similarly difficult time getting answers to the above questions, although a few more answers would have been found a little more easily. But, a funny thing happened on the way to this presentation.

In the process of publicizing my site, I submitted it to the SPN to be considered as another link. I heard back from the webmaster about a month later thanking me for the submission. He also reported that he too had been planning to create a set of links to teaching resources in social psychology. Soon thereafter he added a link to the SPN home page to teaching resources. There was considerable overlap between the resources he found and the ones that I did, not surprising given that we combed many of the same sites.

Consequently, it is now much easier to answer the above questions at the SPN site than it was just a few months ago. So, is there still a need for the CROW Social Psychology site? I definitely believe there is in social psychology and probably even more so in other disciplines. Because my site is more narrowly focused and smaller, it is easier for me to direct instructors to teaching-specific resources more quickly, to provide more detailed annotation and to be more responsive to the needs of a single audience. Moreover, any resources I find can also be added to the SPN site to make it more useful.

Feedback so far

When I officially posted my Social Psychology site on the Web at the beginning of March, 2000, I publicized its presence through relevant listservs, discipline-specific print publications and by asking other social psychology megasites to add a link to my site. Although the site is still new, I have received a good number of universally positive comments from social psychology instructors in several countries. Some comments received include:

> "I've just gone to your site. Very nice! I really appreciate this kind of effort."
>
> "This is great!"
>
> "As a teacher of social psychology I must thank you for this site. It's wonderful! Keep up the great work."

In addition to the informal feedback received, the CROW Project includes funds to pay a reviewer to provide a more detailed, objective evaluation of the site, much like a book review. As of this writing, that review has not been completed.

What's Next?

For my site, I intend to continue to update and maintain the site for the foreseeable future. I also expect to occasionally add new features such as an Examples page, which would include examples I would collect from instructors that would illustrate course concepts. We are always looking for good examples!

As fast as the Web is developing, it is difficult to predict the life of any site. Perhaps such course-specific sites will become engulfed by larger megasites. Or, perhaps academic sites on the Web will become more fractured, serving narrower and narrower audiences. From my experience searching for resources on the Web, I believe that sites targeted to very specific audiences are the most efficient for those users.

For the CROW Project, we are currently talking with a grant writer associated with ACI to consider expanding the project to a larger number of courses. I would like to eventually expand to 100 or so common courses with a common interface and a well-developed support structure in place. As an instructor, I know I would find such a resource very valuable. Someone else has done the exhaustive searching for me, and I can devote my time to teaching.

Note: If you are interested in participating in such a project or developing such a resource please let me know. Thanks.

Student Lab and Technical Assistants at Lynchburg College

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Abstract

Several years ago the Academic Dean of Lynchburg College established an Academic Learning Center for students. The Center is now a central point for student academic assistance. The Center includes a Language Lab, Writing Center, Math Lab, open computer lab (26 stations), quiet study rooms and a Computer Learning Center. The Center is located in the basement of one of the main academic buildings on campus and is open additional hours for the convenience of students. The initial staffing of the Computer Learning Center focused on students capable of assisting their peers with computer dilemmas such as: word processing, e-mail, spreadsheets, printing and other common tasks. This concept has grown to include another large, staffed computer lab in another academic building, web assistants to help faculty, students and staff with web pages, and a technical student staff that assists students in their dormitory rooms. This presentation will detail this evolutionary process and detail how the students are selected, scheduled, compensated, and managed.

Introduction

The Academic Dean of Lynchburg College approached the general faculty in the Spring of 1997 with the vision for an Academic Learning Center in the basement of one of the two largest classroom buildings on campus. Her vision included a Writing Center, Language Laboratory, Mathematics Laboratory, several quiet classrooms, an open computer lab and a Computer Learning Center. The Writing Center, and Math and Language Laboratories were to be staffed by English, mathematics and language majors who would receive formal training in how to manage and run these areas. Faculty were designated to be responsible for each of these student groups. Students who were identified as being talented with computer software and hardware, regardless of major, were recruited to staff the Computer Learning Center and also be available to the open computer laboratory as needed. A member of the Information Technology Staff would be designated to be responsible for the Computer Learning Center. The Language and computer laboratories already existed in the basement of Hopwood Hall (the academic building selected for the Academic Learning Center). Three classrooms were to be reconfigured and furnished to accommodate the Writing Center, Mathematics and Computer Learning Center labs. One small and one large classroom were already available to become quiet learning spaces during designated hours.

The general faculty and student government resoundingly approved the concept for the Academic Learning Center in the Spring of 1997. The faculty/staff member responsible for each area recruited

students to oversee their area. During the summer of 1997 the rooms were reconfigured as mentioned, computers and other necessary equipment purchased, and schedules tentatively prepared for the availability of each area to students in the Fall Semester. It was envisioned that the student staffs mentioned above would staff each lab during the day. The classrooms and large computer lab would continue to be utilized as classrooms and computer labs during normal class hours. The original concept envisioned that the classrooms and the Computer Learning Center would be open 24 hours a day. This meant that the Computer Learning Center would be available 24 hours a day for student assistance with computer dilemmas, and the other spaces staffed as necessary to assist student colleagues.

Student Work Positions at Lynchburg College

Student work positions are established across our campus like many other institutions. An academic or staff area indicates a need for a student worker during the academic year or summer session. A position description for the position is drafted and approved. Then a staff personnel specialist, who works primarily with students, advises students of positions available. Students awarded financial aid, that has a work-study stipend as a part of their aid "package," are given priority for jobs if they are qualified for a position. Financial aid students, not on work-study, are next in line for positions, followed by students who are not on financial aid. In all cases a student must be qualified for the position to which they apply. If qualified work-study or financial aid students cannot fill a position, then non-aid students may apply.

Development of the Computer Learning Center

During the summer of 1997 a classroom was converted into the Computer Learning Center. Around the outside wall of the classroom 12 Window and 2 Mackintosh computers were installed and linked to a network laser printer. A "help desk" station, with a phone for the technical assistant, was also furnished. All computers were linked to the campus network. The blackboards were left in the room for space on which to write notes and messages to anyone using the lab or to leave questions for the lab assistants.

Initially, in the Fall Semester 1997, the Computer Learning Center was assigned to the Hardware Support Director in Information Technology Services (ITS). He worked with the student personnel specialist to find qualified and acceptable students who would staff the Learning Center Lab 24 hours a day. Once students were accepted, the students and the ITS staff person established a fall lab schedule. A responsible senior student became the assistant to the ITS staff person and was responsible for coordinating student staffing and the lab schedule. Training was initially provided, for student who desired additional emphasis, in basic hardware functioning, word processing, campus e-mail systems, and spreadsheets.

When the fall 1997 semester began, student lab assistants were furnished a binder with pertinent phone numbers which they could call for assistance, if need be, and to also maintain a diary of the types of questions that were being asked and service being provided. Initially, and logically, freshmen, were the big customers. Term papers and e-mail easily surfaced as the most frequent areas for assistance. It also became apparent that, with this assistance, that students other than freshmen were also requesting assistance – especially returning adult students.

Since student scheduling interfered with complete 24 hour staffing of the Learning Center Computer Lab, signs were posted indicating that students could call ITS staff for assistance, during normal working hours, when a lab assistant was not available. Priority was given to scheduling students during non-normal working hours.

Other questions, on other application software arose only sporadically. The main focus remained word processing and e-mail. Questions were forthcoming about spreadsheets, PowerPoint, and occasionally databases. When these questions arose, the student assistant was furnished a list of faculty who would assist with questions beyond the lab assistant's expertise. This seemed to function well.

To monitor the performance of the student lab assistants, and the lab, a suggestion box was placed in the lab. During the first semester, the few questions/suggestions offered focused mainly on printing difficulties and availability of administrative supplies and manuals.

It became quickly apparent, during the first semester, that students were not utilizing the Learning Center Lab, or the basement for the full 24-hour cycle – especially on weekends. There were essentially no students from about 1:00 to 8:00 AM. The decision was made, with the concurrence of the student government and faculty, to revise the Academic Learning Center and Computer Learning Center schedules for the Spring 1998 semester. The complex and assistance would be available "officially" from 8:00 AM to 1:00 AM Monday through Thursday, 8:00 AM to 5:00 PM on Friday's, 1:00 PM to 5:00 PM on Saturday's, and 1:00 PM to 1:00 AM on Sunday's.

A new staff member was added to the ITS during the winter of 1998. This faculty person had functioned as a voluntary software trainer for faculty and staff for many years and the administration, with faculty approval, decided to reduce his faculty load, and assign him officially as the faculty and staff application software trainer. It was determined that this person would assume responsibility for the Computer Learning Center, it's student staff, and administrative responsibility for all campus open computer labs and classrooms which contained computer equipment.

The 1998 Academic Year progressed in a manner similar to the initial semester for the Academic Learning Center and the Computer Learning Center. Qualified, talented computer competent students were recruited and staffed the learning center lab. During that period the campus adopted Microsoft Office as its preferred application software suite and changed the student e-mail from a text based to a graphics based program. It also became apparent, during this period, that students were arriving with more computer literacy and capability – and many more were bringing computers with them.

In 1997 approximately 300 students brought computers to campus. In 1998 that number almost doubled to approximately 500 computers. It was projected in the spring of 1999 that this number would increase to close to 1000 computers.

Evolution

With this increasing literacy, and number of computers in student rooms, additional computer lab support and dormitory support became significant issues.

Dormitory Issues

Lynchburg College conducts, as many institutions do, summer orientation sessions for incoming students. Our sessions occur in early June. Like most, we complete student academic schedules, orient and assign the incoming students to dormitories, conduct a student job fair for on-campus positions (including the computer lab assistants), and answer as many student and parent questions as possible. One of the major areas of interest is computing. What computer (capabilities) should a student bring to campus and what facilities are available to the student? Many campus networking, Internet, computer lab, assistance with computing and other questions come tumbling out. A handout has been prepared, prior to these open houses, that furnished desired computer configurations, networking capabilities, and fees. All campus offices, classrooms, dormitories and other logical spaces are networked on our campus. We publish an updated technology manual, which is furnished to every returning, new, and transfer student at fall orientation or check-in. This manual covers most issues about which a student needs information: e-mail configuration and log-in, hardware set-up for networking, file transfer, computer labs, student assistance, and a myriad of other issues.

By the time a student arrives on or returns to the campus, they are fairly familiar with what is available in campus computing and networking, what should be brought in the way of computing equipment, and who to see if there are problems.

Even though the type of networking card and connecting cable information is furnished prior to student arrival, may students arrive with "only" their computer. So, logically, a "rush" takes place to purchase and install cards and cables, get them connected, enter the proper configuration to allow the students access to the network and the all important e-mail. There are never adequate numbers of full time faculty and staff available to handle the mountain of requests for this service when the fall semester commences. Our college has a policy that when a full time staff person works on a student computer, an hourly charge will be assessed. This has been explained to the students and their parents well before the students arrive. However, at a small, private, and perceived expensive institution such as ours, parents feel that such a service should be provided, on a timely basis, at no charge to the student. Thus, the evolution of the Dormitory Technical Assistants began.

During the summer of 1999, the ITS began planning for the projected installation of over 900 dormitory computers. The administration agreed that the Learning Center Lab Assistants would be allowed to return two weeks before the semester began to be trained to assist students in the dormitories with the issues outlined above. Those assistants that chose to return would be allowed to work 40 or more hours a week, prior to commencing their work assistance contracts. Approximately 80% (or 12 Learning Center Lab Assistants) returned early. Once on board they were furnished additional training in Microsoft Office software. They were furnished the Lynchburg College-Microsoft tutorials and immersed in half-day training sessions. When this was accomplished, they were further trained by our software and hardware support staffs in how to place a network card in a computer, connect the card to the network connection box, and finally how to configure the various programs so that the student computer could access the campus network, the internet, and send e-mail.

As students proceeded through check-in they received their copy of the 1999-2000 Campus Technology Manual and logged-in to their campus account in a specified computer lab. Some of the

student tech assistants were available in the labs, with software and hardware technicians, for this log-in/check-in. The other lab assistants were in the dormitories, available to assist with hardware set-up, network connection and software configuration on a first-come, first-served basis. The dormitory Resident Assistants established a schedule for their dormitories for this purpose. Since classes had not yet commenced, the computer lab assistants were allowed to work as long as they felt they could do so. With different graduating classes checking in at different times, to different dormitories, the lab assistants were able to "flex" to the dormitories that were being occupied. For those students who did not purchase the appropriate network cards and cables prior to their arrival, ITS provided cards and cables at a nominal fee.

This process, for the first time through, was an unqualified success. Most student computers were connected and working prior to the beginning of the fall semester. It was obvious that some student technical assistants enjoyed this work more that others. Some indicated that they would assist again at the beginning of a semester, but once the semester commenced they would rather work only in the structure of the Computer Learning Center. Since some student's had not requested to have this service provided prior to the commencement of classes, several student tech assistants were allowed to continue dormitory support as their primary work assignment. Other students were hired to replace these student dorm technicians on the lab schedule.

Computer Lab Issues

During the 1999 fall semester student representatives approached the ITS faculty-trainer concerning the addition of student technical assistants to the computer lab in the other main academic building. While academic facilities are available to all classes, it is logical to assume that faculty desire to offer their classes in the facilities, which house their offices or are close to them – where practical. The original facility staffed by student technical lab assistants was most often used for humanities and business classes. Math and science faculty used the requested facility more frequently. Staffing two computer labs appeared to be a logical request. Not only to provide computer labs with student assistants in them, but to also serve a wider demand for assistance across campus. The administration and student government quickly approved this concept, and additional student lab assistants were engaged to staff this lab in a manner similar to the original Computer Learning Center. It soon became apparent that, because of the location of this lab, that the student technical assistants staffing this lab should be primarily computer science and lab science majors (if at all possible). Computer programming queries and how to manipulate software for mathematical and scientific assignments became more prevalent in this lab. Only infrequently were word processing and e-mail questions asked.

Faculty Classroom Support

As students became more technically oriented, and desired to utilize classroom computer equipment and projectors to display the results of their work, faculty soon began requesting assistance from not only ITS members, but also the students staffing the computer labs in the buildings in which they were offering classes. Many faculty did not have the technical skills that the students exhibited, so quite frequently they were unable to boot the classroom computers, turn on the projection equipment, load the appropriate software. While training had always been furnished as requested, few faculty availed themselves of this until the first problems occurred in the classroom. Additional student computer

support assistants had to be engaged to assist in this environment. These new assistants became classroom/lab tech assistants. Their primary duties involved, after faculty using the equipment had been appropriately trained, checking the classroom and lab equipment on a weekly basis to assure that all equipment was functioning properly, and that all of the necessary lab supplies were available as required.

Current Status

Student Computer Learning Center, Dormitory, and Classroom/Lab Check Assistants now number over 25 students from varying majors, on varying schedules. Management of this diverse group detracted significantly from the primary mission, of the faculty person managing this group – training. Students are trusted to be where they are supposed to be when they are supposed to be there. However, with increasing demands on their expertise, this is frequently not so.

Thus, as this paper was being written, a new full-time staff position has been requested – Help Desk/Student Technical Assistant Supervisor. This position, if authorized, would actually have their office in the Academic Learning Center – Learning Center Computer Lab. They would be responsible for all student support and faculty support for classrooms and labs. In addition, this person would hire and supervise all student technical assistants. This position would report to the Software Support Director.

Presentation

Hopefully, by the time this presentation is made at ASCUE, a response to this staffing request will have been made.

The presentation will include a copy of the Lynchburg College Technical Manual furnished to each student. It will also provide lab schedule information and scheduling hints. The presentation will be accompanied by a Microsoft PowerPoint 2000 "tour" of all of the facilities mentioned in this presentation.

Conclusions

The rapid growth in student support at our institution has resulted in significant student satisfaction. During the past year, the only suggestions received have requested more frequent lab upgrades and a more varied menu in the student cafeteria. One of the current lab assistants is a computer science major and the current SGA president. She indicates great satisfaction, on the part of students, with these ever increasing services.

Microsoft Publisher 2000 – The Hot New Microsoft Office Product

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Abstract

Microsoft Publisher has been around a long time. With the inclusion of Microsoft Publisher in the Office Professional 2000 "package," a number of faculty, staff and students have shown renewed interest in adopting this software for desktop publishing needs. At Lynchburg College a small group of proficient computer users, interested in this software, was assembled to determine if Publisher 2000 was acceptable software for desktop publishing, and what features would be most requested for training. The groups unanimously agreed that Publisher 2000 was all they desired and more. It was agreed that newsletters, brochures, and flyers should be the focus of training efforts. A Lynchburg College-Microsoft tutorial has been developed for this purpose, as well as a technical publishing addendum for those who desire to have commercial firms publish their products. This presentation will review this process, give an overview of the features of Publisher 2000, and furnish a copy of the tutorial and technical publishing addendum to each participant.

Introduction

For many years the Lynchburg College campus (faculty, students, staff) has "searched" for an inexpensive desktop publishing program that would be easy to use. Page Maker, Quark, and a number of other desktop publishing programs were reviewed and found to be expensive and cumbersome. Some persons on campus were proficient in just about every program, but there was no one choice that satisfied all colleagues. Microsoft Publisher had been used by several faculty and staff since the early days of Windows 3.1, but was not considered to be in a league with the other desktop modules.

When Microsoft Office Professional (and Premium) 2000 software became available, during the summer of 1999, a group of proficient faculty and staff software users were asked to evaluate the Publisher 2000 module. With the guidance of the Director of Technical Education and Training at Lynchburg College, several small groups of users were formed (2-3 users per group), and all modules available in the Microsoft Publisher 2000 Catalog were examined. The user sessions normally lasted from two to three hours and quite frequently went "off" in many directions.

The Publisher 2000 Catalog contains a surprising variety of publications varying from newsletters, catalogs, brochures and flyers to calling cards, award certificates, greeting cards, dining menus, event programs, origami and paper airplanes. The user groups tried every feature listed in the catalog. Several times we ended up folding origami parrots or airplanes.

User groups indicated that the most desirable publications from the catalog were: newsletters, brochures and flyers. The groups noticed that there were essentially three "levels" of publications included in this selection: flyers (introductory), brochures (intermediate) and newsletters (advanced). As with most quality software, it was quickly noted that once a "feature (e.g. inserting images or text overflow) was mastered in one publication, the process was logically replicated throughout all other similar publications. The groups also noted that if they were able to master these three publications, that the other publications were rather easy to learn.

Once this "threesome" of publications was agreed to, other less skilled, but extremely dedicated faculty and staff groups were asked to "try out Publisher" and the features that the first groups determined would be most beneficial. These "middle" groups immediately identified specific "clicking" patterns that should be included in the tutorials to make the learning process more beneficial. They also agreed, after a normal two-hour session, that Publisher was a tool, which they could use in many areas of their positions, and that a tutorial would be most beneficial. As these final sessions progressed both graduate and undergraduate students were included. Many of the graduate students indicated that, since frequently they were asked to produce newsletters and brochures for their disciplines, that a Publisher tutorial would be greatly beneficial and appreciated. Undergraduate students felt the same, but for different reasons. They felt that Publisher would ease their work in designing publications for their clubs, fraternities and sororities – as well as flyers for campus events.

Flyers, Brochures, or Newsletters?

The initial dilemma, in creating the Publisher 2000 tutorial, was: which publication should begin the tutorial. The tutorial could begin with the simple flyer, continue with the brochure, and end with the newsletter, or the reverse. Each faculty, staff, student test group indicated their desire to "jump into" the publication for which they had an instant need and then work on the others. Some "students" started with brochures, some with newsletters, and some with flyers – since instructional assistance was available in each session this did not create a problem. But, many persons who utilize the Lynchburg College – Microsoft Tutorials do so without any assistance. A decision was made to begin the tutorial with what was felt to be the easiest publication, the flyer, and progress through brochures to the most difficult, the newsletter.

Flyers

All of the tutorials begin with the loading of Microsoft Publisher 2000. When Publisher loads, a Microsoft Publisher Catalog appears which allows the user to select a publication of their choice – in this case flyers. As soon as a selection is made, a drop down list of different sub-publications appears. In the case of the flyer, Informational, Special Offer, Sale, Event, Fund Raiser, Announcement and Special Paper appear. Thus, as soon as one looks at this selection "list," it can be seen that there are many choices. An elevator bar on the right of the screen allows for the perusal of all of the sub-flyers available. One quickly notices that there are publications with what look like

"themes" running through them (Accent Box, Arcs, Blends, and Marquee are available in the flyer selections). Also, as one "descends" down the screen with the elevator bar, one notices that flyers may be created that have "tear-offs" for persons interested in contacting the flyer originator about the content of the flyer (contacting a tutor, about a sale item, some form of assistance, or an apartment rental, etc.).

The tutorial indicates that after the person using the tutorial has browsed the selections that the person should choose Arcs Informational Flyer to continue the tutorial. (The Arcs "theme" was chosen by the various reviewing groups as being one of the most flexible and easiest to learn. The Arcs will also be selected in the brochure and newsletter.)

Once a selection is made, there is a Start Wizard button in the lower right portion of the screen. One can either "go" to the "finished" flyer, and then change the text and images, or follow a step-by-step wizard instructional sequence. The tutorial chooses to follow the Wizard. The first "thing" which might "overlay" the first Wizard is a Personal Information screen. When a person fist loads Publisher they are requested by the installation program to furnish personal information, which "may" appear, at the user's discretion, in each publication. This information includes the user's name, and a number of selections for professional and personal address, phone, FAX and e-mail information. A person may have completed all of this information previously, and the Personal Information screen will not appear. However, until a person completes this screen, the Personal Information screen will appear in publications, where it might be used, until one completes the information.

The Wizard proceeds logically through a series of "steps" that allow the user to "personalize" their flyer. The first screen allows the user to choose a color scheme of five different, complimentary colors (all choices may be changed later as needed). When a choice is selected, the user will immediately notice that the flyer on the screen is re-colored with the new color scheme. The initial flyer selected contains a graphic selected from the Microsoft Clip Art Gallery 2000. The user is asked if they desire to have a graphic located in the flyer. If Yes is chosen the Wizard, logically, retains the graphic. If no graphic is desired, the Wizard removes the graphic and simply leaves a blank space. The next Wizard asks if the user would like to include Tear-Offs in the flyer. The selections include: Phone numbers, Coupons, Order forms, Response forms, and Sign-up forms – or no tear-offs. The Wizard next asks the user if the user would like to include a Customer's Address. If the selection is Yes, the Wizard creates a "back of the flyer" option, which allows the user to include any of the information completed in the user's Personal Information screen and a place for the customer's address. It also allows the user to create a Postage Paid Permit "stamp." The user may now simply enter a customer's address, insert the address(s) using Microsoft Access Database, or attach mailing labels. This customer address feature is included in all publications where the user desires to mail a publication to someone. The Wizard now asks you which address you choose to use: Primary Business, Personal, etc. The Wizard is now finished and requests the user to select the Finish button.

The initial flyer is now displayed on the right of the screen. The user may select to have the Wizard steps, which appear on the left of the screen, remain there or "hide" them until needed. The tutorial suggests hiding the Wizard steps so that the person using the tutorial may view more of the flyer.

The tutorial now takes the user through editing each of the areas included in the flyer shown on the screen. It begins with the title at the top of the flyer. When the user "clicks-on" an image in

Publisher, they may see a small icon that resembles a two-piece puzzle. This indicates that there are several "graphical features linked together." If a user desires to retain these features, they simply continue to edit the "Wizard title" with their own information. If the user desires to change these links they simply click-on the "puzzle pieces" and the puzzle "opens" and allows the user to "move and change" the objects a they desire to alter. When the user has completed their editing, they may "re-join" the pieces forming a new image-group that will remain together when "dragged" anywhere in the publication. This is another publisher feature that is used throughout all of the publications.

The tutorial next moves to the graphic image at the bottom of the flyer. The initial image is deleted and instructions are furnished on how to access the Microsoft Clip-Art 2000 Gallery. Some time is devoted to this immense group of images. The images fill almost a full CD. There are standard clip-art images as well as photos, audios, and motion clips. The tutorial also includes the new search feature in the Gallery. Again, this feature is available throughout all of the publications.

The tutorial now covers the entering and editing of text by selecting the text area of the flyer. One of the unique features of text editing is that you may create a "link" between Microsoft Word 2000 and any of the publisher products. You may edit your text in Word, select Update the text area in Publisher, review your changes, and then either edit them further in Publisher or return to Word. If a text over flow occurs the tutorial indicates that this subject will be covered in detail in the newsletter tutorial.

The tutorial also covers a very handy feature that may be used throughout Publisher: Zoom-in, Zoom-out. Whenever you identify any object in Publisher (text, image, title, etc.) and tap the F9 function key, Publisher will zoom-in or out to the selected feature. This is extremely helpful as you edit the various selections.

Publisher will also remind you frequently to save your work. While some may feel this is an aggravation, the review groups felt is was a welcome feature. They all found that they easily became mesmerized by all that was happening while working in their publication and would have not have remembered to save if the reminder had not appeared.

Brochures

When the Brochure selection is made in the catalog the various categories of brochures appear. The tutorial again asks the user to use the elevator bar to review the selections: Informational, Price List, Event, Fund Raiser, and Special Paper.

The tutorial indicates, as mentioned earlier, that the user should select the Arcs Informational Brochure. The Wizard again runs through color schemes. However, the next Wizard asks the user to select either Legal or Letter paper size – this is a logical request given that the initial brochure is a two-sided, three fold publication. The next Wizard is the customer address wizard followed by the Order, Response, or Reply form Wizard. The final Wizard again requests, which address the user, would like to use.

When all of the appropriate selections have been completed, with guidance from the tutorial, the Wizard is closed and the tutorial takes the user through new features in the brochure. Since the

address has been previously covered it is only mentioned in this portion of the tutorial – the same with titles, and images.

Since the default brochure is a two-sided, three-fold publication the screen indicates that there are two sides of the brochure to be edited. The left panel of the brochure contains text and an image with a caption. Since text and images have been covered in the flyer portion of the tutorial, only the caption receives attention here. The center and right panels are the mailing address for the customer and business and the title page for the brochure. Again, these have been covered in the flyer, so not additional detail is offered.

The tutorial next moves to the "inside" of the brochure – Page 2. This is the content area of the brochure and for the first time the user may "really" experience "text" overflow from one panel of the brochure to the next. This technique is initially covered in this portion of the tutorial, but in more detail in the newsletter section.

Newsletters

Once again, in sticking with a "theme" the Arcs Newsletter is chosen. The Wizard again begins with a color scheme. The next Wizard asks how many "newspaper columns" (one, two, or three) are desired. We are finding that the three column is used the most so the tutorial indicates that three column should be selected. The user can change the number and size of columns and text area at any time. As the user groups "experimented" more and more in the newsletter, they found that they could quickly size a text "box/column" with a simple click-and-drag at any time. The customer address Wizard is next again. The next Wizard asks if the pages will be printed "single" or "double" sided. This we have found, is of significance if the publication will be printed at a commercial publisher (they desire single page). The last Wizard, again asks which address the user desires to use.

When the Wizard's are closed the first page of the newsletter appears. Since titles, images, captions, and text boxes have been covered in the flyer and brochure portions of the tutorial, they are not covered again here. However, the first page of the newsletter contains a table of contents for the newsletter. The tutorial guides the user through a method to capture article titles, their page numbers, and then indicates how they can be inserted in the table of contents.

Next the tutorial discusses the number of pages in and the editing of a newsletter. If the single side option is/was selected, each page will appear as a separate page. If the two side option is/was selected then, for the default four page newsletter, page one is viewed as a single page, pages two and three (inside) are viewed together as one wide page, and page four is viewed separately. The users are asked to re-display the Wizard and select two-sided for a tutorial exercise in text overflow. They are then requested to select pages two and three. For this text overflow exercise the users are requested to delete the "story/text box" at the top of page three. The users are then requested to select the story at the top of page two, and edit the story in Microsoft Word (to create a text overflow condition). Users are then asked to Close and return to Publisher. When users return to Publisher they "see" how text overflow appears in a document. They are then guided through how to take the overflow, at the top of page two, and link and paste it into the open area at the top of page three. Some really "neat" icons are featured as a part of this process.

Technical Support Addendum

While the tutorial is sufficient for most on campus (in company) publication "jobs," it was quickly found that it did not successfully address all of the requirements for commercial publishers. The Lynchburg College staff responsible for off campus publishing was extremely helpful in taking the "first" Microsoft Publisher 2000 departmental newsletter to a commercial publisher.

Coincidentally, while the tutorial was being completed, the History Department requested that they be allowed to become the first department to use a campus designed Microsoft Publisher 2000 template. The History Department "collected" articles for their newsletter and then "pasted" them into the newsletter template (as instructed by the tutorial). They inserted text, images, color, their college address, a postage permit "stamp, and changed column sizes as suggested by the campus publications staff. The final result in Publisher was a very nice newsletter. However, when the History Newsletter was sent to several leading publishers for bid, they all came back negative. No publishers in the Lynchburg area were using Publisher as one of their programs.

The publication staff met with several local printers who were interested in developing a "relationship" with Microsoft Publisher. The publication staff "showed" the printers the capabilities of Publisher and requested that they be told where Microsoft Publisher 2000 was not supplying the proper "standards" required by the publishing industry. From those meetings the Technical Support Addendum was created.

The addendum indicates that the newsletter must be submitted on a diskette (zip disk or CD) and that text must be in a recognizable form (columns, etc). Details how to achieve that form in a Layout file are included in the addendum. Each font used in the newsletter must also be furnished to the commercial printer in True Type Font format, in a separate folder, saved on the diskette in a Fonts folder that is a sub folder to the Layout folder. The addendum indicates how images must be in a specific format, specific size, and located in a separate Links folder that is also a sub folder of the Layout folder. In our publications we normally use two colors for text and highlighting, backgrounds, etc. The colors must also be specified in various gradients and tints. This fortunately is done in Microsoft Publisher in conjunction with some "standard" color schemes that all major publishing firms utilize (kind of like choosing a paint color for your house using those little strips of paper that the paint store furnishes). Once all of this is done, Publisher works just like it's more expensive competitors.

Conclusions

Having completed the entire cycle - from testing Microsoft Publisher 2000 on students, faculty, and staff users for ease of use, appropriate desktop publishing features, writing and testing the tutorial, publishing a "test" newsletter with a commercial printer, and completing the technical addendum, we at Lynchburg College feel that we have found the perfect desktop publishing tool for our "everyday" publications. The faculty, students and staff find that the sequence of using the tutorial for an introduction to Publisher, then completing projects, is fairly simple. "Old hands" with Page Maker and Quark have started to look at Publisher. They seem to be finding that everything they "had/have" is available in Publisher.

The bottom line: Microsoft Publisher 2000 is an inexpensive, reliable, easy to learn desktop publishing package.

A copy of the current "edition" of the Lynchburg College-Microsoft Publisher 2000 tutorial will be available to each participant in this presentation.

All of the Lynchburg College-Microsoft tutorials (Office 97/98/2000) can be downloaded from:

http://www.lynchburg.edu/userguide/

The tutorials have become so popular internationally that they are being translated into French. So, we have created a CD, which includes all of the tutorials in Microsoft Word 97 (English) - available at no cost - to those who desire a copy. Simply contact me if you desire a copy.

Microsoft FrontPage 2000 - Is This Web Page Development Tool All That It Should Be?

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Abstract

For the past several years Lynchburg College has developed Microsoft tutorials for use with academic classes, and faculty, student and staff training. These tutorials are "webbed" and available at no cost to anyone. Their popularity is now international. So, when Microsoft FrontPage 2000 became available, a new tutorial was developed for this software. This tutorial includes both web page creation and editing, and web site creation. After using the tutorial for six months it has become a valuable addition to the tutorial "collection." This presentation will review how many other users have used this tutorial, both on our campus, and elsewhere. Each participant will receive a copy of the tutorial.

Introduction

In the late 1980's Lynchburg College was faced with a dilemma similar to many other institutions of higher learning. There were many expensive manuals on the market for various software applications. Some were elementary, and some were superb. Some popular, inexpensive software often did not have any manuals or tutorials. Regardless, the purchase price for commercial manuals and tutorials to a student was, in most cases, significant.

At Lynchburg College it was felt that a student, depending on discipline, should have a competence in word processing, spreadsheets and databases. The average cost, for what was considered a decent manual, ran in the $ 30-50 range. Frequently, there was too much content in these manuals, and a great deal of it was not tailored to a general course. The decision was made to develop specific, general tutorials that covered the "most used" aspects of each software application. The initial Microsoft Office tutorials were created in beginning in 1995.

As time went on the need to add a web development tutorial became obvious. The reviews in many leading computer journals/magazines indicated the Microsoft FrontPage 98 was their choice for a web development tool. So, The initial Lynchburg College-Microsoft FrontPage 98 Editor tutorial was created during the spring semester 1998 and tested on students, faculty, staff and the Lynchburg community during summer 1998.

The original tutorial attempted to create a single web page utilizing the Microsoft FrontPage 98 Editor. It included each element that a person would normally utilize in a web page: text, photographs (scanned pictures and internet images), graphics, animations, sounds, colored backgrounds, links to other web pages or "effects" within the authors computer or to the internet. In addition to placing these effects in the tutorial web page, manipulation of these items was also addressed.

It became apparent that user's of this tutorial also desired an additional tutorial to create a web site of several linked web pages. In the fall of 1999 a second, and complementary tutorial, Microsoft FrontPage 98 Explorer was created for this purpose.

The FrontPage 98 tutorials were updated, tested and revised in January 2000.

Microsoft FrontPage 2000

Microsoft Office 2000 became available during the summer of 1999. Many Microsoft users appeared satisfied with the functionality of Office 97/98 and did not request updates to the Office 97/98 tutorials. However, when the 1999 holiday season included many vendors offering significant savings on new computers that included Office 2000, and affordable upgrade prices to Office 2000, many asked that an Microsoft FrontPage 2000 tutorial, that included web page and web site creation, be authored.

Thus, the Microsoft FrontPage 2000 Web Page and Web Site tutorial was created and tested during January 2000. An intensive one-week symposium of faculty from several small, private colleges used the tutorial to create web pages and web sites for their spring 2000 courses. Since that time several training sessions for local K-12 school systems and schoolteachers have used the tutorials. Several classes at Lynchburg College are using this tutorial during the spring semester. It appears to be well accepted as of the writing of this paper.

A Creating a Web Page and Web Site Using Microsoft FrontPage 2000 for Windows 95/98/2000 Tutorial will be furnished each participant so that you may follow the areas below during this presentation and then refer back to the items below once the conference has concluded.

Some Interesting Notes and Features of FrontPage 2000

Microsoft has created a more flexible and powerful FrontPage 2000 web page and site creation tool. It appears Microsoft has recognized that many of the features that it creates in FrontPage 2000 will only work in Microsoft Explorer browser. So, there is now a feature, if you are interested, that only allows FrontPage 2000 to create web pages that will load in all browsers. If you click-on Tools in the Menu Bar and then click-on Page Options, you will see a "Compatibility" tab. You may then choose the browsers on which you desire your web pages to "work" correctly. Once you do, FrontPage 2000 will not allow you to use features that will not work in other browsers.

You will notice, as soon as FrontPage 2000 is loaded and viewable on you monitor, that in the lower right corner of the screen a small hourglass that indicates so many seconds at 28.8. This is an indicator of how long the page you are creating will take to load over a 28.8 speed modem! As you

increase the length of your page, enhance images, add additional effects, this time will be ever changing to give you and idea of how long it will take other to load your web page. A right click of the mouse on this area will cause a pop-up menu to appear which allows you to change the type of cable or modem speed which you would like to use. As you change them you will notice, logically, the load times increase of decrease. The default is the slowest modem that most folks use today.

Initial Web Page Creation

Initial web page creation remains very similar to that in FrontPage 98.

However, as a person familiar with FrontPage 98 will notice, as soon as FrontPage 2000 loads and can be viewed on the monitor, FrontPage 98 Editor and Explorer have become one as can be seen by the looking at the Views Bar on the left of the screen. The Editor is now referred to as Page, the first Icon button at the top of the Views Bar. The other buttons below are from Explorer web site manager. The initial blank web page appears as it did previously. However, now that Editor and Explorer are combined, the "title" you name the page now displays at the top of the page to the right of the Views Bar.

Creating and Editing Text

Creating text is also similar to FrontPage 98. However, you will notice when you activate the Font menu to enhance your text, there are a number of additional features. There is a new effects area that furnishes you more effects and a new "tab" that allows for character spacing. Since all web pages are in HTML, you are still limited to the seven HTML font sizes.

If you are really into colors you will notice a small eyedropper in the More Colors feature. You may select the eyedropper and "wander around" your web page. As you are "dragging the eyedropper" over various colors, you may click-on a color, the eyedropper will "pick-up" the color and return it as a color selection to use with the font on which you're working.

Inserting Photographs, Digital Images, Animations Clip-Art and the Like

On the surface it looks like placing images in your web page is pretty similar to FrontPage 98. However, a really neat new feature has been added – Absolute Positioning. Once you have an image, or images, inserted in you web page, you will notice in the Positioning and Picture Tool Bars, if you have them displayed, a small, yellow, square button above some small lines. When you run your cursor over this button and pause, it will indicate Position Absolutely. You are now free to select an image, click-on this button, and then move it anywhere you like! No more using Picture Properties and Tables to place your pictures where you want them. You can even create collages of images – animated and otherwise – just where you want them. Image positioning – bring to top – send to back works with these images. They will stay absolutely positioned until you decide to change them.

While discussing images you should also note that there is a new feature that is called Auto Thumbnail. An Auto Thumbnail button is located in the Picture Toolbar to the right of the Text "A" at the very left of the toolbar. Many users like to use a smaller version of an image, which they will enlarge on a separate web page, to link to the larger image. Frequently, the smaller image (as inserted

in the web page) will cause the main page to load very slowly. Clicking-on the image in the main page, then clicking the Auto Thumbnail button, will cause the main image to be reduced to a predetermined thumbnail size. The original page main page will now load more quickly. You can change your thumbnail setting by clicking-on Tools in the Menu Bar and then on Page Options as you did above. When you select AutoThumbnail you will be able to edit thumbnail default sizes and other effects.

Web Plagiarism

Since the first Lynchburg College – Microsoft FrontPage 98 tutorial was created there has been much more attention given to web plagiarism. Many folks, both faculty and others, have contacted us concerning this element in our initial tutorial. While FrontPage 2000 does not address this – obviously – the new tutorial gives some additional focus to web plagiarism and provides an excellent link to all forms of plagiarism.

Links, Animation, Sound and Backgrounds

These remain fairly constant between FrontPage 98 and 2000.

HTML Code

Both FrontPage 98 and 2000 have the three viewing tabs at the lower left corner of the screen: Normal, HTML and Preview. You may edit your web page in Editor 98 (Normal tab) and then Preview your page (Preview tab) or Preview in the browser of your choice. You may continue this process in FrontPage 2000. You may also reveal the HTML code in both 98 and 2000 by clicking the HTML tab.

One new feature in FrontPage 2000 is Reveal Tags. In FrontPage 2000 you are able to actually see the HTML "marks" or tags in the Normal view. To see these tags you simply click-on View in the Menu Bar and then on Reveal Tags. The various HTML tags will appear "around" your text, images, etc. This is handy when you are attempting to maintain some common features in you web page such as text sizes, etc.

Creating a Web Site

The first thing you notice, if you have become used to having both the Editor and Explorer open in FrontPage 98, is that these two features are combined in FrontPage 2000. When FrontPage 2000 is loaded you will notice in the Views icon bar on the left, FrontPage defaults to the Page icon button. This is synonymous with Editor. The other icon buttons are synonymous with Explorer icon buttons. Anytime you are in Explorer and want to edit a page, simply double click on the page and it appears in the Editor (Page View).

File Saving and Retrieval

One of the other things that most new users of FrontPage 2000 notice immediately is that you may now save and retrieve your web sites the old fashioned way – by clicking on a drive and then clicking

on a file name. In FrontPage 98 Explorer you had to go through all kinds of goofy steps to establish a web site. Now, in FrontPage 2000, you only have to select a page in a web site and the entire site is loaded. To many, the old Open an Existing Web and then trying to find the correct path to the web (More Webs – type-in path – List Webs) was a great headache. This was especially true when working with training groups who knew little about file management and computers, but wanted to construct a web site using FrontPage 98 Explorer rather than creating and linking individual pages in the Editor.

Shared Borders, Navigation Bars and Themes

In Front Page 2000 Shared borders have to be applied as you create your web site. In FrontPage 98 they were a default. This is a bit confusing at first, but once you get the "hang" of it, this feature allows a lot more flexibility as you construct your web site. Shared Borders are the areas on the top, bottom, left and right, where, if you allow FrontPage 2000 to automatically link your pages as you construct your web site, you will also automatically create link "buttons" of your choice, in the borders of your choice, to each page as you create them.

Navigation bars are still pretty much the same as before. They, with Shared Borders, complement each other.

If you decide to add a Microsoft Theme to your web pages it looks fairly similar to FrontPage 98. However, if you look closely at the bottom of the Themes menu screen you will see a Modify button. When you click-on it, you will notice that you are now able to change your Theme colors, graphics (buttons and the like) and text styles. This is a new feature that many have found appealing.

Publishing Your Web Site to a "Public" Source

This still remains a problem if you allow FrontPage to select the web page file names when you save your web pages. FrontPage assumes that you are in a high tech environment and will allow long page titles. I still find that many public sites only allow the "old" eight continuous character/number conventions. We have had several local charities (with whom we have assisted in creating their web sites) discover, to their dismay, that the ISP only allows the eight-character/number convention. This has resulted in our assisting with "renaming" many, many pages so that the web site could publish.

A copy of the current "edition" of the Lynchburg College-Microsoft FrontPage 2000 tutorial will be available to each participant in this presentation.

All of the Lynchburg College-Microsoft tutorials (Office 97/98/2000)can be downloaded from:

http://www.lynchburg.edu/userguide/

The tutorials have become so popular internationally that they are being translated into French. So, we have created a CD, which includes all of the tutorials in Microsoft Word 97 (English) - available at no cost to those who desire a copy. Simply contact me if you desire a copy.

State Mandated Education Standards on Technology

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Introduction

In the state of Kentucky, colleges and universities that have teacher preparation programs are mandated by state law to incorporate "standards" within each individual program. The newest standard, Standard Nine, was passed in June 1999 and was designed to demonstrate how technology would be implemented within a curriculum.

To better understand the history of our current education program in Kentucky, the presenter will give a brief history of KERA (Kentucky Education Reform Act). In 1989, the Supreme Court of Kentucky outlawed the public educational system and demanded instant reform. The result, a direct collaboration between educators, state legislators, and the Kentucky Department of Education (KDE), was KERA. This new system totally revamped the educational system at all levels in Kentucky. KERA was approved and passed into law (House Bill 940) by the General Assembly in 1990.

Technology was and is an integral part of KERA. Therefore, the implementation of technology must be assessed at all levels K-12 as well as post-secondary education. In addition, KDE (State Department of Education) has longed to control more of the post-secondary curriculums of colleges and universities across the state. Now through KERA they (KDE) found ways of asserting those controls.

In the colleges and departments of education, pre-service education programs are now mandated to prepare future teachers according to "New Teacher Standards", these standards were developed by committees of educators from all areas and levels. All colleges and universities must use these standards as a basis for development of their curriculums.

As previously stated, technology has always been an integral part of KERA. Before the last and ninth standard on technology was developed, technology was assessed in all the other eight standards. But starting in July 1999 we as teacher training institutions had to abide by the new letter of the law.

In order to grasp the full scope of this section of KERA, the presenter will give a brief overview of the first eight standards before focusing on the ninth standard. The new teacher standards were first introduced to colleges and universities in 1992.

Standard I Designs/Plans Instruction

The teacher designs/plans instruction and learning climates that develops abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.

1. The preservice teacher focuses instruction on one or more of Kentucky's learning goals and outcomes.

2. The preservice teacher develops the student's ability to apply knowledge, skills, and thinking processes.

3. The preservice teacher integrates skills, thinking processes, and content across disciplines.

4. The preservice teacher proposes learning experiences that are developmentally appropriate for learners.

5. The preservice teacher describes experiences for multiple levels of complexity to accommodate students at different levels of performance.

6. The preservice teacher incorporates strategies that address physical, social, and cultural diversity and shows sensitivity to differences.

7. The preservice teacher establishes physical classroom environments to support the type of teaching and learning that is to occur.

8. The preservice teacher includes creative and appropriate use of technology as a tool to enhance student learning.

9. The preservice teacher includes appropriate assessment strategies and processes.

10. The preservice teacher includes comprehensive and appropriate school and community resources that support learning.

11. The preservice teacher includes learning experiences that encourage students to be adaptable, flexible, resourceful, and creative.

Standard II Creates/Maintains Learning Climates

The teacher creates a learning climate that supports the development of student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.

1. The preservice teacher communicates with and challenges students in a positive and supportive manner.

2. The preservice teacher establishes and maintains standards of mutually respectful classroom interaction by establishing the importance of shared expectations during individual and group responsibilities.

3. The preservice teacher shows consistent sensitivity to individual academic, physical, social, and cultural differences and responds to all students in a caring manner.

4. The preservice teacher shows flexibility and modifies classroom processes and instructional procedures as the situation demands.

5. The preservice teacher organizes materials and equipment to create a media-rich environment, including technology.

6. The preservice teacher motivates, encourages, and supports individual and group inquiry.

7. The preservice teacher uses classroom management techniques that foster self-control and self-discipline.

8. The preservice teacher encourages responsibility to self and others.

9. The preservice teacher promotes student willingness and desire to receive and accept positive and negative feedback.

Standard III Implements/Manages Instruction

The teacher introduces/implements/manages instruction that develop student abilities to use concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.

1. The preservice teacher communicates specific outcomes and high expectations for learning.

2. The preservice teacher links learning with students' prior knowledge experiences family and cultural backgrounds.

3. The preservice teacher models/demonstrates the skills, concepts, attributes, and/or thinking processes to be learned.

4. The preservice teacher uses multiple teaching/learning strategies that are appropriate to student development level and actively engages students in individual and cooperative learning experiences.

5. The preservice teacher makes appropriate provisions for learning to address diversity among students.

6. The preservice teacher elicits samples of student thinking and stimulates student's reflection on their own ideas and those of others.

7. The preservice teacher uses appropriate questioning strategies to engage students' cognitive processes and stimulate higher-order thinking.

8. The preservice teacher guides students to express, examine, and explain alternative responses and their associated consequences relative to moral, ethical, or social issues.

9. The preservice teacher demonstrates interpersonal/team membership skills and responsible caring behavior with students in facilitating instruction.

10. The preservice teacher uses multiple perspectives and differing viewpoints to facilitate the integration of knowledge and experiences across disciplines.

11. The preservice teacher makes creative and appropriate use of media and technology.

12. The preservice teacher makes efficient use of physical and human resources and time.

13. The preservice teacher facilitates equitable engagement of students on productive tasks.

14. The preservice teacher provides opportunities for students to use and practice what is learned.

15. The preservice teacher identifies student misconceptions, provides guidance, and offers students continuous feedback on progress toward outcomes and expectations.

16. The preservice teacher links learning with student aspirations for the future.

Standard IV Assesses & Communicates Learning Results

The teacher assesses learning and communicates results to students and others with respect to student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.

1. The preservice teacher uses multiple assessments and sources of data.

2. The preservice teacher makes appropriate provisions for assessment processes that address social, cultural, and physical diversity.

3. The preservice teacher accurately assesses student performances using established criteria and scoring guides consistent with Kentucky's performance assessment program and the Commonwealth Accountability Testing System (CATS).

4. The preservice teacher promotes student self-assessment using established criteria and focuses student attention on what needs to be done to move to the next performance level.

5. The preservice teacher systematically collects and analyzes assessment data and maintains up-to-date records of student progress.

Standard V Reflects/Evaluates Teaching/Learning

The teacher reflects on and evaluates specific teaching/learning situations and/or programs.

1. The preservice teacher accurately assesses, analyzes, and communicates the effectiveness of instruction and makes appropriate changes to improve student learning.

2. The preservice teacher analyzes and evaluates the effects of learning experiences on individuals and on the class as a whole and makes appropriate changes to improve student learning.

Standard VI Collaborates With Colleagues/Parents and Others

The teacher collaborates with colleagues, parents, and other agencies to design implement, and support learning programs that develop student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.

1. Thepreservice teacher identifies or recognizes situations when and where collaboration with others will enhance learning for students.

2. The preservice teacher articulates the purpose and scope of the collaborative effort.

3. The preservice teacher articulates outcomes of each collaboration event.

4. The preservice teacher demonstrates productive leadership or team membership skills that facilitate the development of mutually beneficial goals.

5. The preservice teacher demonstrates tolerance to alternative perspectives and options and encourages contributions from school and community resources.

6. The preservice teacher demonstrates sensitivity to differences in abilities, modes of contribution, and cultural backgrounds.

Standard VII Engages in Professional Development

The teacher evaluates his/her overall performance, refines the skills and processes necessary, and implements a professional development plan.

1. The preservice teacher provides evidence of performance levels and articulates strengths and priorities for growth.

2. The preservice teacher articulates a professional development plan to improve his/her own performance and to expand his/her repertoire to facilitate student achievement of the learning goal.

3. The preservice teacher engages in relevant professional development activities and follows through with a plan.

4. The preservice teacher shows evidence of improvement in performance and evidence of increased capacity to facilitate student learning.

Standard VIII Knowledge of Content

The teacher demonstrates a current and sufficient academic knowledge of certified content areas to develop student knowledge and performance in those areas.

1. The preservice teacher accurately communicates the skills and core concepts related to certified academic areas.

2. The preservice teacher effectively applies the methods of inquiry related to the certified academic areas.

3. The preservice teacher incorporates a multicultural/global perspective in content presentations.

4. The preservice teacher utilizes technology related to the certified academic areas.

5. The preservice teacher connects knowledge of the certified academic areas to real life situations.

As the presenter stated earlier, these eight standards have been on the books and implemented since 1992. Also there were and are many implications for technology to be found in any and/or all these standards. Yet many educators felt that a completely new standard focusing only on technology should be developed, and in 1999 it was.

Standard IX Technology to Support Instruction

The teacher uses technology to support instruction, access and manipulate data; enhance professional growth and productivity; communicate and collaborate with colleagues, parents, and the community; and conduct research.

1. The pre-service teacher operates a multimedia computer and peripherals to install and use a variety of software.

2. The pre-service teacher uses terminology related to computers and technology appropriately in written and verbal communication.

3. The pre-service teacher demonstrates knowledge of the use of technology in business, industry, and society.

4. The pre-service teacher demonstrates basic knowledge of computer/peripheral parts and attends to simple connections and installations.

5. The pre-service teacher creates multimedia presentations using scanners, digital cameras, and video cameras.

6. The pre-service teacher uses the computer to do word processing, create databases and spreadsheets, access electronic mail and the Internet, make presentations, and use other emerging technologies to enhance professional productivity and support instruction.

7. The pre-service teacher uses computers and other technologies such as interactive instruction, audio/video conferencing, and other distance learning applications to enhance professional productivity and support instruction.

8. The pre-service teacher requests and uses appropriate assistive and adaptive devices for students with special needs.

9. The pre-service teacher designs lessons that use technology to address diverse student needs and learning styles.

10. The pre-service teacher practices equitable and legal use of computers and technology in professional activities.

Conclusions

As post-secondary educators in the state of Kentucky, we must use the mandated "Standards" to prepare future teachers. At Pikeville College, the division of education is currently assessing how to incorporate all areas of "Standard IX" into our curriculum.

During Spring 2000, the division added a new position to our existing faculty and hired a specialist in educational technology to fill it. In addition, all computers on campus were upgraded, and faculty were all provided with new machines.

In the near future, the division plans to provide all education majors with laptop computers for personal use. We also plan to incorporate more educational and core courses on-line. Our desire is to provide new and exciting ways to use distance learning in our curriculum. Our hope is to stay as current as possible with the standards and use technology in the educational curriculum.

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E-Commerce: Background and Implications for Education

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Abstract

The current abundance of **.com** advertisements that appear on television are indicators of the increased impact that electronic commerce is having on our society. Many colleges are reacting to the need for individuals with technology skills and business basics by offering new programs of study that focus on doing business on the Internet. In addition to marketing and business concepts, these programs develop technical expertise in the areas of web page design and systems and database development.

This paper will present a brief overview of the development of electronic commerce applications as well as the implications for higher education as efforts are made to offer educational programs that provide students with a competitive advantage.

Introduction

For many years, businesses have been exchanging data electronically. During the 1970's, electronic funds transfer (EFT) in the banking industry, using private secure networks, revolutionized financial markets. (Kalakota, Electronic Commerce, p. 6). In the 1980's, electronic data interchange (EDI) became popular and allowed for a just-in-time manufacturing and delivery system and a reduction in inventory, warehousing, and handling costs (Ibid. p 6.) A major problem with EDI was the lack of standards in representing transaction types in data structures and formats had to match exactly in order for the exchange to work (Huff, et.al. In the 1990's, we began to make references to doing business in cyberspace. The advent of the World Wide Web (WWW) on the Internet provided the breakthrough necessary for electronic commerce in the form of an easy to use technology solution. Using the WWW or Internet as a data transmission medium makes electronic commerce a cheaper way to do business, allows for diverse business activities and enables smaller businesses to be competitive (Ibid., p. 7).

Electronic commerce or e-commerce means shopping on the part of the Internet called the World Wide Web (WWW). The financial expectations for consumer e-commerce are expected to exceed $800 billion by 2003. A more significant impact will be experienced in the business to business side of electronic commerce. Although many people use the terms electronic commerce and electronic business as synonyms, electronic business is often used to refer to electronic commerce in a broader

sense (Schneider, p. 2). Huff, in Cases in Electronic Commerce, (p. 4) cites a study from the Orion Group that opines that electronic business includes "everything having to do with the application of communication technologies to the conduct of business between organizations or from company to consumer". In e-Business: Roadmap for Success, Kalakota discusses the comprehensive the critical elements encompassed by e-Business, namely business processes, back-office and front-office applications, and strategy. An e-Business infrastructure is necessary to execute an e-commerce model.

A Business Transformation Example

In 1999, IBM made important progress toward its goal of transforming itself into a premier e-business. Sales of services over ibm.com averaged $40 million a day during 1999, and $50 million a day in the fourth quarter (.com, IBM Annual Report, p. 40). Efforts focused on e-care for customers and business partners as well as supply chain management and distributed learning. E-business services are projected to represent nearly 60 percent of the total e-business opportunity by 2003, and IBM is forming alliances with Internet service providers, application service providers, independent software developers and professional service firms in order to position itself (Ibid).

The IBM Report (p. 3) goes on to state "The dot-coms are taking over. You can't chart future strategy, execute a transaction, invest money, even read a paper or a magazine or watch TV without bumping into dot-coms and the world of e-business". Recall the commercials on the 2000 Super Bowl as evidence to substantiate the above statement by IBM Chairman and CEO, Louis V. Gerstner, Jr. A conservative estimate is that e-business opportunity will approach $600 billion by 2003; while the overall information technology (IT) industry grows at about 11 percent, the e-business portion is growing at around 22 percent (Ibid.)

According to the 1999 IBM Annual Report (p.6), IBM has been operating on the basis of three major trends, namely:

- The Internet is creating not just new businesses, but new business models;
- Competitive advantage in the IT World is moving from creating technology to helping customers use it; and
- The rise of the networked world has ended the PC era.

The report also indicates that three new trends are emerging (p.7);

- The primary impact of e-business to date has been on individual companies; now the Internet is reinventing entire markets;
- Market control is no longer a sensible or achievable business goal;
- The intersection of societal issues and the Internet will force the technology industry to assume a new level of public responsibility.

The IBM example is cited because it represents a technology giant in transition. It's not business as usual. Contrary to the past practice, the business emphasis will not be on product; as over the next five years more than half of the revenues and workforce will come from services, as the company is transformed into a leading e-business. The IBM annual report (p.43) proudly boasts of an unmatched collection of professionals devoted to advancing open Internet standards and applications. Included are more than 500 XML, 600 Linux, and 4,000 Java professionals. Obviously, these are competencies that we in the education community should be aware of.

Skills Needs Assessment

The Computerworld Skills Survey (p 64.) provides an annual comprehensive view of the technological skills that are in demand. A summary of the 1999 survey results follows:

- People with web skills, to build Internet and intranet-based applications.
- People with e-commerce related knowledge. Included are competency in the areas of C++ and Java development, along with object-oriented analysis and design.
- People with project management, interpersonal communication and business knowledge. People must understand project and system life cycles and communicate effectively to all levels of management.
- The need for networking professionals is proliferating because of the e-commerce explosion. The need for network designers and developers is tremendous. From the Computerworld Survey (Ibid.), 24% of the respondents are seeking people with network protocols, particularly TCP/IP and 31% have needs in the area of Windows NT.
- People must be able to understand the "big picture." There is a strong need for people who can work on teams. This does not speak well for the pure "techie."
- Also related to the e-commerce craze is a pressing need for database skills, especially Oracle.

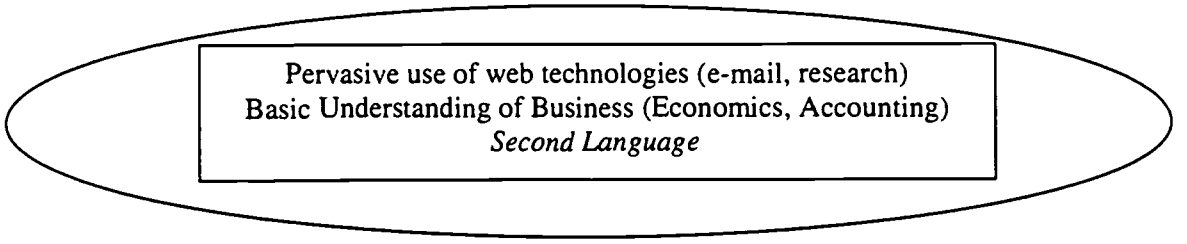
The general feeling among survey respondents is that skills and knowledge in networking, database and web-building will continue to be important. Understanding the "big picture" and applying that understanding through project management will also be quite important. Following the Y2K push, there is general consensus that the need for COBOL programmers will diminish substantially.

Interestingly for higher education, an increasing number of organizations are indicating that they plan to build technical expertise through extensive training of current employees. Some organizations are unimpressed with the quality of entry level applicants, and prefer to invest in people within their organization who have an interest in technology and who have a business understanding. Among key areas for training are Java, HTML and C ++. Much money is also being spent for consultants, especially those with a proven track record in project management. (Whitford, p. 211).

In an April 14, 2000 presentation by Susan M. Vismor of Mellon Bank to Duquesne University's MIS Advisory Board, a similar summary of skill needs were presented as essential to work in Mellon

Bank's e-commerce functional areas. A summary of that presentation is depicted in the diagram below:

eCommerce Functions/
Skill Sets Required



STRATEGY	TECHNICAL INFRASTRUCTURE	WEB OPERATIONS	MARKETING
Financial Deal Makers	Strong Unix (or NT) orientation		**Graphics:**
	Object Oriented Analysis & Design		
Technology Strategy	Java		Adobe Photoshop
	Distributed Objects (Corba, EJB)		DreamWeaver
Creative, out of box	eCommerce Product set (Websphere)		Flash
	Professional Project Management		
Sales/Interpersonal	Oracle Development Expertise		**Dealmakers**
	Telecommunications/Networking		
	Security		

Program and Curriculum Implications

In the ever-changing technology area, the need for constant monitoring and curriculum modification is critical. A school's reputation is built in large part by the quality and preparedness of its graduates. We owe our students the best program of studies that we are humanly and economically capable of delivering.

A belief shared by many is that e-business is here to stay. We are living through a period of a significant process transformation in how we, as a society, conduct business. From a business school perspective we are very interested in business processes. We are interested in the implications of e-business beyond technology requirements. Actually, from the 'big picture" point of view alluded to earlier, the technology component may be the simplest component of conducting e-business.

Because the structural transformation to e-business affects the entire organization, it is safe to conclude that this is not a technology "thing". Technology is merely a tool or an enabler in a much more impactful process. It is an opportunity to innovate the end-to-end customer experience. Fully integrated and satisfying business back-end and front-end experiences are a significant differentiator in e-business (Kalakota, p.14).

In considering the breadth of impact of e-business on the organization, the following should be taken into account:

- Customer relationships – Most organizations believe that customer service and fulfillment are paramount to organizational success and competitive advantage. In transforming to e-business, an organization must align people, processes, strategy and technology and strive to build and retain the lifetime value of customer relationships in a cost effective way (Kalakota, p. 135).

- Selling chain management is an order acquisition strategy. Because of increased global competition and shorter product life cycles, the need to increase revenue per customer and more accurately forecast future sales has intensified (Kalakota, p. 162).

- Enterprise Resource Planning (ERP) is the backbone of e-business. It is the business operating system that serves as the first step in overhauling antiquated back-office systems. ERP systems must change with business needs. These systems are the most critical element to business success and competitive advantage (Kalakota, p. 192).

- Supply Chain Management, simply stated, is the process of creating products and delivering them to customers. It involves the coordination of material, information, and financial flows among all participating parties. To reduce costs, companies are restructuring the way products are designed, manufactured, warehoused, transported and sold (Kalakota, p. 228).

- E-Procurement deals with the transformation to more efficient procurement processes and the elimination of inefficient buying, redundant processes and nonstrategic sourcing (Kalakota, p.231).

The above list of affected functional business areas begins to explain the far-reaching impact of a business transformation to e-business operation. It also serves to substantiate the point that technology is only part of the transformation process.

E-Business Education Program

In developing an E-Business concentration for our graduate program, we were mindful of the implications discussed in this paper. The following section briefly describes our coursework. In designing our MBA concentration in Electronic Business (e-business), we attempted to address most of the issues and needs mentioned in previous sections. We did not view the program as a technology program, but instead as a management program with a technology emphasis. The author is of the opinion that specialized programs such as e-business will be absorbed over the next several years as e-business will become standard operating procedure for the majority of businesses that survive. Currently, there is a huge demand for specific skill sets related to e-business, because nearly every organization wants to get their initiative underway so they can do business on the Web. There will be a settling effect to this movement, and in addition, more and more packaged software will serve as "out of the box" enablers to implement the technology side of e-business.

To address our needs at the MBA level, we assembled a concentration consisting of 18 credits. This concentration is taken in addition to the business core courses that are typical of most MBA programs. A brief description of the required coursework for the Duquesne University concentration in Electronic Business follows:

- Electronic Business I is an overview of the managerial side of electronic business using the supply chain management model as a basis for discussing strategic and managerial implications. (2 credits)
- Electronic Business II deals with the technical side of creating and maintaining an electronic business site. (2 credits)
- Electronic Marketing deals with the critical success factors behind electronic business and the issues in developing an e-business marketing plan. (2 credits)
- Ethics and Legal Issues deals with the ethical and legal issues relative to the Internet and to the management of a successful electronic business. (3 credits)
- Purchasing Management deals with the electronic procurement process and the implications associated with the transformation of that process to suit an e-business model. (3 credits)
- Systems Analysis and Design is a core information systems course that introduces students to the systems process and includes the systems development life cycle as well as object-oriented technologies. (3 credits)
- Database Management is a core information systems course that focuses on the design and development of relational databases. (3 credits)

Conclusion

The IBM scenario described earlier is an indicator that constant change and monitoring are necessary to gain or retain a competitive advantage. Businesses are faced with the prospect of reshaping themselves or falling from the ranks. As educators, it is important for us to discern what, four years hence, the competencies it will take for our students to be competitive. My contention is that educational needs are also changing as a result of our technology driven world, and we are charged with the responsibility of being aware of changes and reacting with appropriate instructional materials and programs.

Although there are some among us in higher education who feel strongly about the difference in education and training, one can no longer be content to deliver a course because it was pertinent and of high quality three years ago. Technology is not only affecting the commercial world around us, it is also affecting our educational processes. In many cases, it is making us facilitators of the learning process.

In my judgment, e-commerce as a separate, distinct entity will be quite short-lived. The process of how we do business will change quite dramatically over the next several years, and will subsume

specialty niche programs like Electronic Business. But, for the time being, as was substantiated by the expressed needs of technology professionals, we need to examine and update our curricula to ensure that what we are teaching is relevant, worthwhile, and desirable in today's marketplace. We need to ensure that the foundation we provide for our students is solid.

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The Role of Industry Certifications in Colleges: One Experience

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Macon State College is one of the institutions in the 34-institution University of Georgia system and has a current enrollment of 3,700. We have recently become increasingly involved in industry certification efforts, particularly in the Microsoft arena. We are also venturing into the Cisco certification arena. Macon State College now processes over 1,000 students a year in the industry certification arena. We started slowly two years ago and have built up a sizable infrastructure to support our efforts in training persons in various industry certifications. We propose to describe this evolutionary process so others may duplicate it and, importantly, all the obstacles we have encountered and their associated solutions.

(Gary and Richard's paper was not available at the time the Proceedings went to press. They will supply copies of the paper at their talk.)

Building A Pre-Class Community

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Digital technologies have begun to find many comfortable seats in the classroom, as faculty have started to develop sensible ways to place new technologies in the service of learning. Few faculty members or universities have begun using the technologies to build and cohere academic programs, however. Discussion boards, Internet forums, and video conferencing have been often used to expand the classroom. Far less often has these tools be used to create a community that will draw students to a campus program and make them more comfortable and more successful once they arrive on campus. Last spring the DePauw University Honor Scholar Program began a pilot experiment to test whether on an online forum could be used successfully to attract high caliber students and to ease their transition if they elected to attend the university.

The Honor Scholar Program is a highly selective, interdisciplinary program at DePauw that admits about twenty students each year. It is open to students of all majors who show unusual promise for and commitment to the development of the life of the mind. In the first five semesters, members of each Honor Scholar class choose for one of their courses an interdisciplinary seminar in which they read, discuss and write about classic works of enduring significance as well as recent works under the close guidance of senior professors.

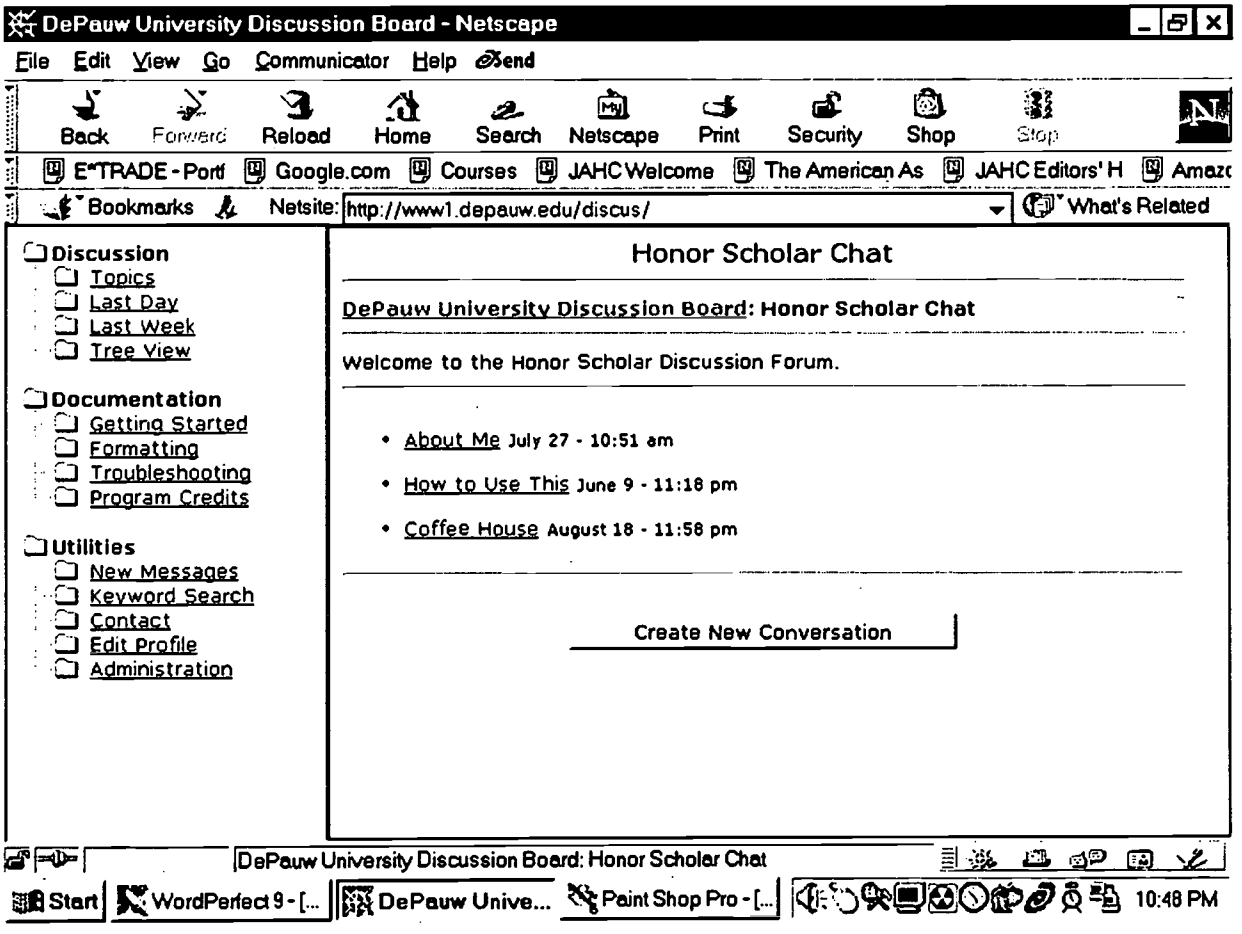
During their last two semesters at DePauw, Honor Scholars pursue independent work culminating in an Honors thesis written under the direction of one or more faculty members. Being an Honor Scholar implies more than formal academic study. Opportunities exist for Honor Scholars to mix socially and informally with one another and with members of the faculty. Above all, the program provides an opportunity to be part of a group that seeks especially to find in its college education an intensive and stimulating intellectual experience.

The students who are selected for the Honor Scholar Program are also the students who are hardest to attract to any university or college campus. They show great creativity and clarity of expression, were intellectually and socially involved in high school, have high board scores, and stand at the top of their class. In nearly every case, these students are being recruited by several elite national colleges and universities. Thus, attracting them to any program is a challenge. Overestimating the degree of preparation and maturity that such students will bring their first year is also easy. Despite high achievement in high school, in fact often because of it, the first year is a period of awkward transition. Learning to meet the new rigors and forms appropriate to college, managing separation anxiety,

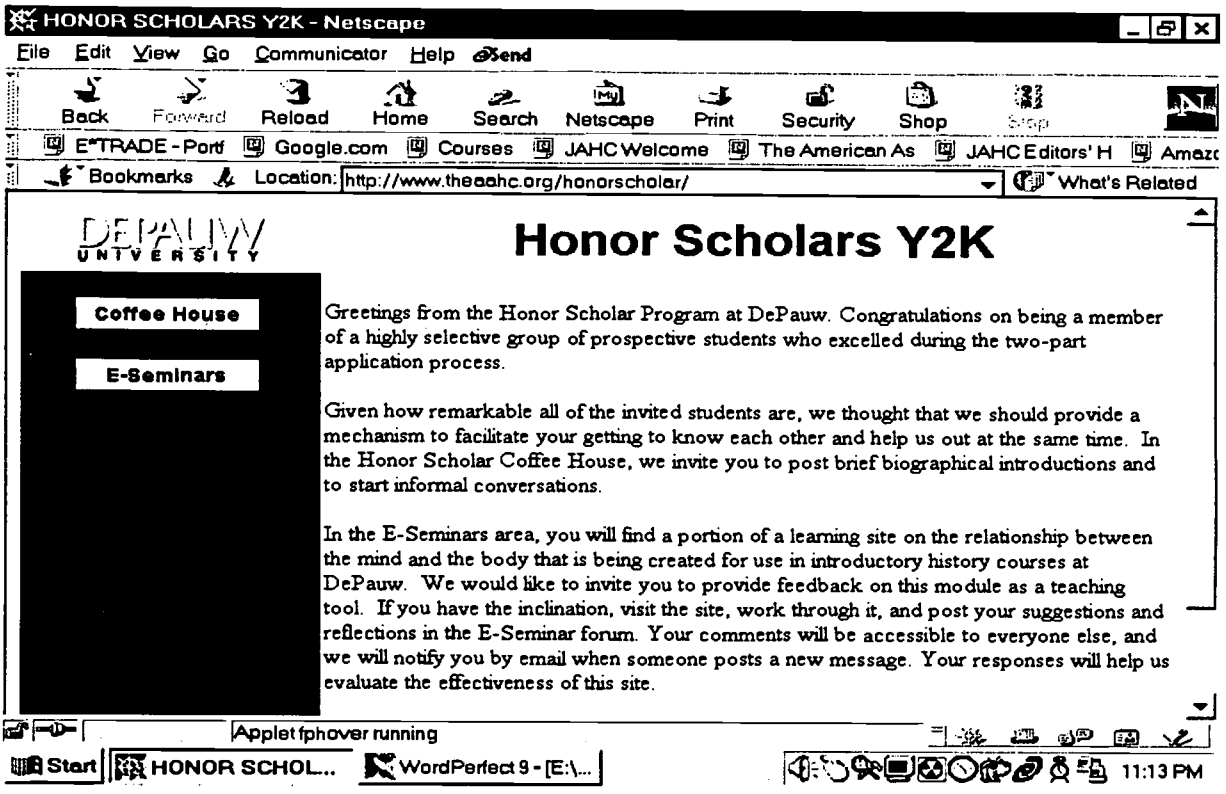
adjusting to a new peer group of bright, critical, self-assured students, and testing new levels of autonomy are no small feats for any group. Our hope with the Honor Scholar Discussion pilot is that we can help students establish a community. This community experience then becomes a mechanism to aid acclimation to the nature of life on campus and in the college classroom, before they arrive as first year students in the fall.

In the spring and summer of 1999, the program was first set up using Discus (http://www1.depauw.edu/discus/). For those of you unfamiliar with the package, Discus is a free WWW discussion board software package developed by Kevin Paulisse and William Polik of Hope College (http://www.discusware.com/discus/). Discus allows the creation of a Discus board through a metaphor very similar to a file cabinet. Different drawers devoted to different conversations can be created, and participants can be given passwords (keys) to these drawers as the moderator desires. For the 1999 pilot, two primary drawers were created –"About Me" and the "Coffee House." About Me was the forum for personal dialogue and introductions. The Coffee House was intended to be a salon-like environment, where serious topics could be discussed amicably.

Because no precise tracking strategy was developed, assessing the success of the 1999 pilot is difficult. It was certainly a very successful matriculation year for the program. Invitations to join the Honor Scholar Program were extended to thirty-seven students. Twenty of these students are currently enrolled. Further, seven of the top targeted ten students in the invitee group accepted the



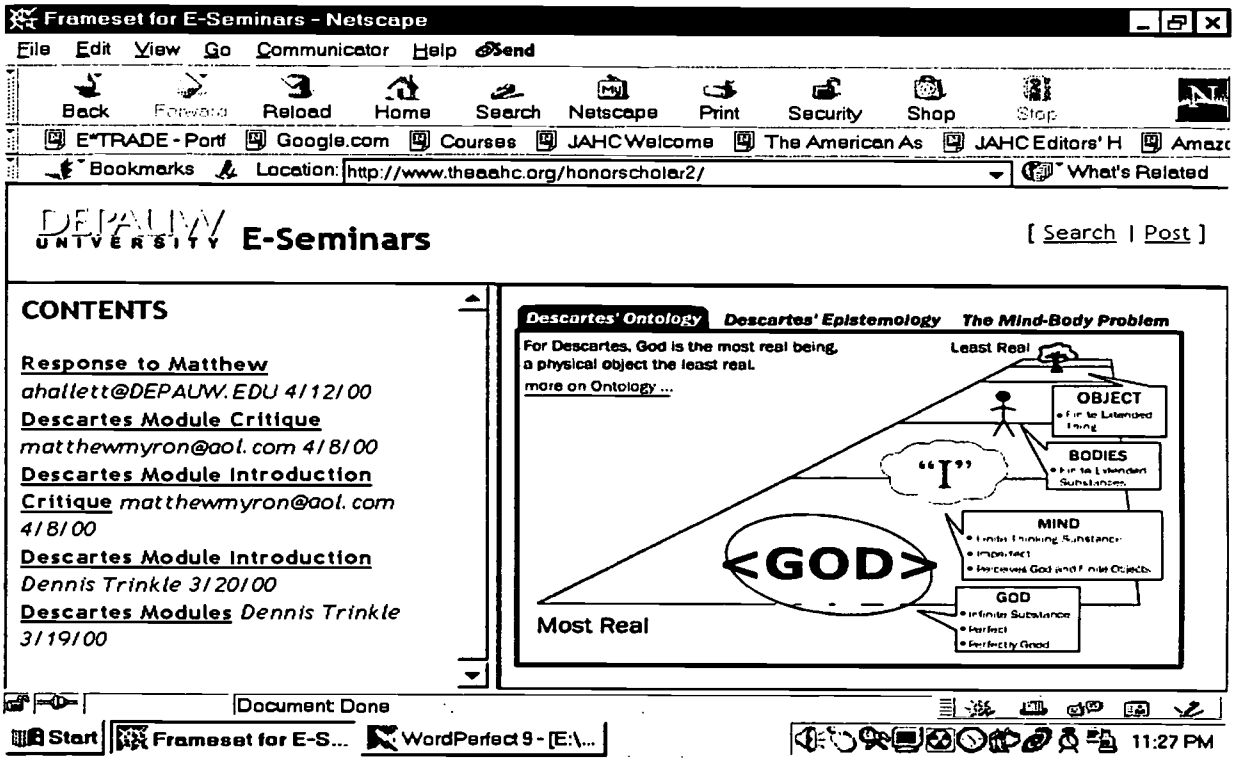
invitation. Those students who participated in the pilot seem to have enjoyed the experience and profited from it. These students said that they gained a sense of what other students applying to the



Honor Scholar Program were like and found that they felt their initial class discussions were more comfortable than they anticipated.

Track to the forum and dialogue on the site did not meet our high hopes, however. Several possible explanations were isolated. First, there was no notification to the participants when a new message was posted. Conversation and involvement happened hugger-mugger as students (and faculty) had time to visit the list. Second, we perhaps overemphasized free participation and direction at the cost of momentum, that is, we did not seed the conversations enough in the Coffee House, or provide enough focus.

For 2000, Dennis Trinkle created a discussion forum with Microsoft FrontPage and Macromedia Dreamweaver that would notify students by email anytime a new post was made. The goal for this year's pilot is the same, and a formal and informal arena for discussion is again being tried–this time the informal area is the "Coffee House" and the formal area is the "E-Seminar" area. To add focus to the "E-Seminar" area, the students are being asked to criticize a Macromedia Shockeave module on Descartes' Mind-Body problem that is being developed for use in an introductory history course. As Descartes asked his readers to question all certainty, we are asking the students to raise questions about Descartes' ideas and about the usefulness of interactive, animated modules for teaching abstract concepts.



Such conversations represent well the type of dialogues that occur in typical first-year Honor Scholar Seminars. Students are asked to discuss and assess not only ideas, but the presentation of ideas, the nature of disciplinary argument, and other issues that students have often spent little time considering in high school.

So far, this year's pilot might be more successful [Note: By June, a fuller picture of this year's discussions should be emerging, and the presentation at ASCUE will incorporate this added detail.] Students have already offered some telling assessments of the modules, and they are digging into the heart of Descartes' ideas about human understanding and the relationship between the mind and the body. For example, one student has caught Descartes in a circular argument. He wrote, "Beneath one of the illustrations, there was a sentence that read as such: "Because God is good, the representation of external objects through the senses is a true depiction of reality." This statement threw me. First of all, how can we assume that God is good rather than neutral or evil? Second, how does God being good have anything to do with creating a true depiction of reality through the senses?" Another student has offered a clear reply and explanation:

> "You brought up some interesting points in your analysis of the modules. First, you questioned Descartes' assumption that God is perfect and good. His reasoning was that since he is imperfect, there must be a higher being that is perfect. He doesn't take into account the possibility that perhaps the universe isn't ordered but rather chaotic and imperfect. You are right to question whether God is benevolent. The Christian God that is omniscient, omnipotent, and benevolent cannot logically exist. This fundamental contradiction arises from the fact that evil exists in the world. If God knows that evil exists and can prevent it, then he is not benevolent because evil exists. Of course this cut and dry logic does not take into

account many important elements that religion is based on, such as faith. Still, when Descartes assumes that God is good, he leaps into an entirely different realm of knowledge. The other question that you raised is interesting as well. Because Descartes has decided that God is good, the statement in the module naturally follows. If God is good, then he would not try to deceive us. Thus we can be assured that what we perceive is the truth. If God distorted our perception, then he would not be the benevolent God Descartes wants him to be. It is interesting that Descartes is relying on a leap of faith to determine that God is good, but then tries to apply logic to determine the truth in our perception. We could just as easily say that God distorts our perception, but that he is still good. How can we believe this? By taking the leap of faith that Descartes has already taken. By juxtaposing faith and logic, Descartes manages to create a system that he is happy with. On the other hand, you are very right in challenging his assumptions and methods of deduction. I hope you post again. This is fun."

Only time will tell us whether this effort will be productive in helping recruit these highly motivated students to DePauw and the Honor Scholar Program. We are trying to balance our efforts to intrigue these high school students into helping recruit each other with the demands they already have from their high school. We are clearly at the very beginning of a process that when refined will be an asset for recruiting a selected group of students who have many higher education options. Toward this end, we hope that the presentation of this information will be followed by an open discussion of reaction to the effort and suggestions regarding improvement to this endeavor.

Using the WEB to Engage Students in Computer Science Courses
(A Work in Progress)

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Introduction

The Computer Science curriculum and major at DePauw University is probably similar to those at other liberal arts colleges. We try to help our students develop good problem solving and critical thinking skills while focusing on fundamental principles of the discipline. We weave recurring themes such as "levels of abstraction", "trade-offs", "analysis of algorithms", and "representation of information" through our courses. Sometimes these themes do not seem relevant to our students because they appear to be disconnected from the rapidly advancing world of computing and technology and from what they plan to do after they leave the academy, working as WEB designers, dot-com entrepreneurs, network managers, or consultants.

It is difficult with a major consisting of eight courses in Computer Science and two in Mathematics to cover the discipline's fundamental principles in the liberal arts tradition and also introduce students to the latest developments in technology. As technologies come and go, for example in the software development arena, we tend to let our curricular needs drive our choices instead of the technologies driving our curriculum. On the other hand, we feel an obligation to provide students and ourselves with knowledge about current developments.

So the question is, "How can we continue to offer our curriculum and integrate new technologies in meaningful and connected ways?" In this paper I will describe how World Wide Web and Internet technologies might be used to make these connections in interesting ways and also provide opportunities for students to learn about current technologies. Examples from two courses, each taught for the first time in academic year 1999-2000, will be used to illustrate these ideas.

Exploiting the WEB and the Internet

The WEB was used as the focus of a five week small team project in each of two junior-level Computer Science courses, *Modeling and Simulation* and *Database and File Systems*. The projects were designed to be closely related to actual real-world problems driven by the fundamental ideas that have always been discussed in each course.

Modeling and Simulation

This course, offered approximately every other year, was taught in fall, 1999 semester. This course, normally taught at the advanced undergraduate or graduate level at other Universities, was designed for undergraduates with a background in data structures, discrete mathematics, and some calculus. It serves as an introduction to analytic and simulation modeling with an emphasis on the latter, with a focus on the modeling of queuing networks. One of the course goals is to develop an understanding for capacity planning and computer system performance analysis. Topics include the modeling cycle, analytic and simulation models, open and closed queuing network models, bottleneck analysis, random variable generators, and probability related to modeling. Students implemented a variety of simulation models using the graphical system AWESIM from Pritsker and Associates and C++ with the simulation library, CSIM from Mesquite Software. Unfortunately there seems to be no textbook suitable for liberal arts undergraduates.

The course is based on mathematics, much of which is intuitive and elementary, but seems dry to many students. So I tried to devise a project which would be interesting, real and give practical meaning to the mathematics and modeling techniques we would explore.

By coincidence, for the past nine months or so, the University had been experiencing very poor response time from its WEB server and from its T1 connection to the Internet. All the students in the class were well aware of this and interested in anything that could be done to remedy the situation. I took advantage of the situation and announced on the first day of class that the goal of the course would be to develop a simulation model of the University's WEB server and campus network to see if we could pinpoint the performance bottlenecks and make recommendations to correct them. But first we would have to acquire the requisite knowledge and develop a methodology to construct the model. The plan was to work on the problem during the whole semester with the majority of the work occurring in the last five weeks. In that way we could introduce topics just-in-time for each phases of the project.

We actually began the project with an experiment on the second day of class. The experiment was conducted with the help of Computing Services staff and consisted of the class members as a group each executing a prescribed navigation sequence against the University's WEB. Computing Services staff collected a variety of statistics during the experiment and we calculated average response time by hand. After a few weeks into the semester we were able to use the data collected from the experiment to produce gross asymptotic bounds analysis of WEB response time and throughput. The average response time we calculated by hand fell exactly into the predicted range, giving us encouragement to proceed with the larger part of the project.

You must fully understand a system to model it. So in addition to learning about modeling strategies, event driven programing, and the underlying mathematics, we had to learn about the pieces of a WEB transaction, Internet protocol and routing probabilities, the makeup of the campus network and associated bandwidths, and details of the WEB server which was a VAX running under VMS, delivering e-mail services in addition to WEB services. Moreover we had to gather data about network and VAX resource usage and corresponding workload over some time interval and reduce that data to a form that made sense for the simulation being developed.

The class was divided into teams of five students. Each team defined the scope of their model. Some modeled only the WEB server, others modeled the whole network with the WEB server as a node. A lot of class time was given to working on the model. We addressed issues as they arose and invited guest experts, mostly from the Computer Center when we could not otherwise find answers to technical questions.

Students were engaged and worked hard for the most part. For example the following dialog occurred on our WEB discussion board during data reduction time.

Question:

"MATH PEOPLE: It's our understanding that all of the math people divided the calculations among themselves. Would it be possible for you to all post the results of your assigned calculations as soon as you finish them? Thanks- "

Response:

"Okay, some more numbers for everyone's simulation."

In the 30 min time there were 1774 HTTP requests using 19.15 Cpu time.
That means 1 arrival every .99 sec that uses an exp(.011) cpu.

The mail processes are a little more intricate. Of the 1647 total (1 arv every .92 sec) processes, 1290 (78%) were POP mailing that used (.011) cpu time.

The other (22%) were students/faculty who clicked on the tiger icon in the 30 min time span. The login/logout creates a constant overhead of .30 cpu time. Of these 48.5% went into pine and used .30 + exp(2.24) of cpu time. 27.3% ran mail and used .30 + exp(.32) cpu time. 24.2% did not run either (didn't have emails..aka friends) and used .30 cpu time to log in and out.

I hope these help with your simulations."

Although students were working hard and engaged, student course evaluations were a little disappointing. Students viewed the course as unorganized. Some of this may be related to having no textbook. Students are also not comfortable working on projects that are open-ended and which have no guaranteed outcome. "How will you grade this?" On the other hand, the evaluations were much better than the previous offering of the course. So I am encouraged to repeat this strategy the next time the course is offered.

Database and File Systems

The course is offered once each year, and is being offered as this paper is being written. It is open to students with a background in data structures. Database design and implementation is the primary focus of the course. A good portion of the course is devoted to studying database models such as the Extended Entity-Relationship model, the Relational model, and a brief look at the Object-Oriented model. Students study the relational algebra, relational calculus, and various forms of normalization.

This semester they used Oracle 7 and Oracle 8i for most projects including the final project and had a brief exposure to MS Access. Characteristics of secondary storage devices, methods of organizing information, various file organization and accessing techniques, and how these are used to implement database management systems are also being studied. There are many textbooks for this course. This offering used *Fundamentals of Database Systems, Third Edition* by Elmasri and Navathe

The course is popular because it is viewed as valuable for their future after graduation. It also happens to be one of those courses that are viewed as extremely valuable more so after graduation than while it is being taken. The topics of data models, algebras and calculi are not particularly exciting or interesting to them. They have seen MS Access with its GUI and have aspirations to learn that or a similar package.

To motivate students I used the same technique as in the Modeling and Simulation course. The first day of class we talked about the WEB explosion and e-commerce. We visited a few sites, like Amazon.com, and quickly realized that databases provide the infrastructure for interactivity and data management. I then announced that the goal for the semester was to develop an interactive WEB site driven by a database. They would work in teams to do this. The majority of the work would occur over the last five weeks of the semester and we would develop the necessary background the first half of the semester, concentrating particularly on database design. The assignment was less open than in the modeling course, but students still have freedom work within their abilities and desired scope.

Project Description:

Design, implement, and populate a database system using Oracle 8i. You should construct a robust WEB front end that allows for data entry, modification, and retrieval. You should work in teams of three. Either choose a project from the following list or propose a system which will have to be described in detail sufficient to gain approval for the project from your instructor.

<suggested projects were listed here>

The system you implement should be complex enough to apply many of the ideas covered in this course. You will be asked to turn in work-in-progress at several stages, which will count for homework points.

At the final exam you should hand in a complete system containing corrected or updated versions of your (extended) entity-relationship database schema including attribute descriptions and notes concerning relationships or entities that are not apparent from the E-R diagram, the corresponding relational database schema and relational schema diagram, listings of the statements used to create the database tables, listings of the code for each WEB page that drives the database, the URL of your database homepage, and a map of your WEB site with a functional description of each page. This will count for final exam points.

Checkpoints:

1. (Thursday, April 6) A neatly prepared entity-relationship data model. The model should include:
   - a brief statement (one page or less) describing the purpose of database and functions it will provide.
   - a description of each strong and weak entity type. For each entity type include a list of attributes and identify the key or partial key attribute accordingly.
   - A description of each relationship type explaining why it has its particular cardinality ratio.
   - An E-R diagram.
   - Any other notes about system features that are not be explicit in or apparent from the above.

2. (Thursday, April 13) A neatly prepared translation of your E-R model to a relational model schema. The model should be in 3rd normal form.
   - Be sure all primary and foreign keys are clearly identified and domain types specified.
   - Specify domain and referential integrity constraints.
   - Any other notes about system features that are not be explicit in or apparent from the above.
   - Include a relational schema diagram

3. (Tuesday, April 18) Translate the relational model into a database definition using the Oracle DDL language. Minimally populate the database with test data. Turn in listings of your create statements and simple select query results showing that the tables are functional. You may do this on the Acad system and later copy your system to the NT Server.

4.(Tuesday, April 25) Turn in the URL of your home page, which should be implemented, even if the hyperlinks are not yet active. Also turn in a site map with a description of the function each page. The site does not have to be fully implemented.

5.(Tuesday, May 2) All pages of the site map should be implemented and linked even if all database functionality is not complete.

6.(Tuesday, May 16) Final project as described above is due at the beginning of the final exam..

Students are currently working to finish their projects. Some groups are producing wonderful sites, others are struggling. They are engaged and for the most part excited about their project. This project has brought a new dimension to the course as well as new material to learn, including WEB authoring and design, vbScript, and Active Server Page technology. These topics are not discussed formally in class unless students ask or general problems arise which affect the class as a whole.

I hope that the adjustments made for this course from lessons learned in the fall will result in more positive student feedback when course evaluation results are available.

Conclusion

I am encouraged about this approach to integrating new technologies with fundamental principles. None of our curricular goals have been sacrificed and I believe students have learned more than in prior offerings of there courses. I have learned from the experience, about this mode of teaching and about the new technologies that were introduced. It takes a lot of time to teach courses in this manner because of the unpredictable questions or technical issues that may arise. These require an immediate response to preserve student momentum and interest.

I plan to continue with these ideas, again next fall in *Computer Science I* which I will be teaching as a first year seminar for twelve to fifteen new students and next spring for the next iteration of *Database and File Systems.*

It FITS: Strategies for Supporting Faculty Use of Technology in Teaching

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Abstract

In 1998, DePauw University received a grant from the Andrew W. Mellon Foundation to develop an instructional technology support program for faculty. Subsequently we launched FITS, our Faculty Instructional Technology Support program. As part of the FITS building process, we have offered many programs and activities, including faculty workshops, a consortium-wide symposium about technology in education, and student internships. We also enlisted outside consultants to assist with projects, utilized peer support from willing faculty members, and supported professional development of FITS staff. In this presentation, we will discuss our philosophies and methods for FITS, experiences with FITS activities, methods of assessment and future strategies.

(Carl and Carol's paper was not available at the time the Proceedings went to press. They will supply copies of the paper at their talk or give a web address at which it can be found.)

Using Active Server Pages and a SQL Server Database to Create a Class Scheduling System

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Abstract

This paper will discuss and show how Active Server Pages and a SQL Server database can be used to create a class scheduling system. The goal is to allow department chairs to match professors with courses that will be taught during the upcoming semester. The associate dean takes these requests and assigns rooms and times, based partly on preferences of the department chairs. Microsoft FrontPage can be used to create the HTML with embedded ASP code. A discussion of the problems faced and their resolution and/or workarounds should be of interest to anyone attempting such an endeavor, while the requirements, specification, and design should be of interest to anyone involved with a class scheduling system.

Introduction

In the Fall of 1999, the software engineering class at Winthrop University was looking for a simple, but not trivial, problem for their software engineering project. A two semester project-based course, the first semester of the software engineering course was concerned with determining requirements, determining specifications, and the initial design of the project while the second semester of the course was concerned with finishing the design, and implementing the project.

The project involved the requirements, specification, design, and implementation of a software system to automate much of the paperwork that was currently done in scheduling classes for the upcoming semester in the College of Business. As this involved four clients, the Associate Dean and the three department chairs, some form of distributed system and synchronization was necessary.

During the first semester, the 17 students in the class were broken into four groups of four or five students. Each group interviewed one of the four clients to determine user requirements. Once the individual requirements were obtained, submitted, and graded, each group was given access to the requirements of all of the clients and each group was then tasked with combining these individual requirements into an overall project requirements list.

After gathering the requirements, each group created the specifications for the project. In most good software design, every specification should be traceable to some user requirement.

Some of the models used for the design included data flow diagrams, logic modeling techniques, entity-relationship models, and finite state modeling. Some of the relevant parts are discussed here.

The Underlying Data Model

A brief description of some of the underlying data model is now described.

The **Rooms** table contains the available class rooms. The **Buildings** table associates rooms in the **Rooms** table with buildings in the **Buildings** table. At this time, almost all courses are in just one building, but there are always a few that are in other buildings, or even off-site. Important attributes of the **Rooms** table include the number of seats in the classroom and the multimedia capability of the classroom.

It would be nice if the system design was scalable to more than one college, more than one building, etc. However, for the immediate needs, scalability was considered but not required for the systems design.

The **TimeSlots** table contains the available time slots for courses. Here are just a few examples.

MWF 8:00-8:50 MW 8:00-8:50 MW 8:00-9:15 M 8:00-9:15 W 8:00-9:15

Note that the time slots for a given set of room assignments are mutually exclusive in that two classes cannot meet in the same room at the same time, but that the time slots do have to cover many possibilities.

The **Teachers** table includes information about every possible teacher for the college, from adjunct to full professor. The **Departments** table allows teachers to be grouped into departments so that department chairs can concentrate on just the teachers who teach courses for their department.

The **Courses** table includes information about every possible course that might be taught by the college. At this time, prerequisites and student information is not part of the system.

The ultimate goal of the system is to allow the easy creation of a **Classes** table that associates a course with a time slot with a room with a teacher. Note that when the software is used, this table does not yet exist. When complete, the **Classes** table, for this semester, is submitted to the Registrar for class creation. Since the class does not yet exist, the Registrar number for the class does not yet exist, so a temporary class number is used. The design calls for a check, after the Registrar list is published, to insure that there are no discrepancies between the classes requested from the Registrar and the classes scheduled by the Registrar.

Since this database is not the "official" database, the design calls for many of the tables to be updated in a semiautomatic way. For example, the teachers table is actually maintained elsewhere on campus and it seems a pity to waste time and effort maintaining separate tables. The semi-automation of these tables, without tight coupling requiring the explicit cooperation of the owner of the database, was investigated but not implemented.

Implementation Considerations

A major implementation decision revolved around the platform to be used. The two obvious approaches for such a distributed system were to use the network to share information and synchronize actions, or to use the Internet to share information and synchronize actions.

The network approach has a number of disadvantages. First, every client would need to be connected to the network and able to share information. This would require coordination with the local computing staff. Second, every client would need to use the same platform (e.g., Windows) or else multiple platforms would have to be supported (e.g., Windows, UNIX, Macintosh, etc.). Third, once the solution was in place, any change in the network configuration might require substantial change in the software system.

The other primary approach is the web-based approach. By using an Intranet on the Internet, multiple platforms would not need to be supported. Any client with a web browser would be able to use the system. From a security viewpoint, the client would need certain information (e.g., a userid and password) to use the software system. In addition, changes by the local computing staff would have less dramatic impact on the system as the technology used on the Internet is not likely to change much as far as making old capabilities obsolete.

The disadvantage of the web-based approach is that, from the author's point of view, there is a lot of new technology (e.g., unknowns) that must be investigated and integrated into the course. In this case, the advantages greatly outweigh the disadvantages. Especially considering the increasing importance of web-based e-commerce shopping cart applications, the web-based approach seemed the way to go. One of the most popular technologies for web-based e-commerce shopping cart applications, and the alternative selected for use, was Microsoft Active Server Page technology. This technology was already supported by the local computing staff. More importantly, anyone with a Microsoft Windows 98-based computer, which comes with Microsoft Personal Web Server, and with access to Microsoft FrontPage (already licensed), Microsoft Access (already licensed), and Microsoft Internet Explorer (free for the download and included with Windows 98) can freely download and install the Active Server Page extensions and, thereby, create their own stand-alone computer development system for this web-based technology.

The local computing staff supports SQL Server as a database platform. Although the author was set up with a database on that Server, for the first go-around, it seemed better to use Microsoft Access. The disadvantages are that Access is not as robust, especially for concurrent usage (although, in this case, there would never be more than 4 concurrent users). Without special setting by the web administrator, Access databases can only be used for read-only access. For most of the project, however, this was sufficient access.

Active Server Pages

To understand the Active Server Pages model, one needs a little bit of background.

Communication on the Internet is built on the TCP/IP protocol which allows messages to be sent to/from any computer connected to the Internet, or, on a network running TCP/IP.

One form of TCP/IP messages is HTTP, hypertext transfer protocol. One form of HTTP messages is HTML, hypertext markup language. HTML is the standard formatting notation used by web pages. The client is the workstation on which the web browser is making the request and the server is the web server whose services are requested by the client. A web transaction goes as follows.

- The client opens a connection to the server and requests a web page from a server.
- The server receives the request, and sends a response, and closes the connection.
- The client receives the response, formats the response, and displays it to the user.

There is nothing remembered by the server of the connection. To solve this problem, the Internet cookie was introduced.

The problem with using HTML is that, although it is good for adding content to the Internet, and linking that content together, HTML does not allow for much dynamic interactivity. To solve this problem, client scripting languages such as JavaScript and VBScript were developed. There are two primary problems with client-side scripting.

- Not all browsers may support the client scripting language.
- Developers of client scripting code must make that source code available to client browsers, since anyone wanting to see the source code can do a view source on the web page being displayed.

The solution developed by Microsoft (and a few other vendors) was to create a server-based scripting language called ASP, for Active Server Pages. Using the same syntax as Visual Basic and the VBScript client scripting language, ASP runs on the server. While an HTML file has a file extension of **.htm**, or **.html**, an ASP file has the file extension of **.asp**. When requested, the server processes the ASP file which, when processed, generates an HTML file which is sent to the client. Since only HTML, with perhaps some client-side scripting code, usually in JavaScript for greatest compatibility, is passed to the client, the client browser must only support HTML and client browsers do not have access to the source code that generated the HTML. Thus, both problems with client-side scripting code are addressed with ASP.

In addition, ASP script files can be safely given access to databases on the server. This allows sophisticated e-commerce and other applications to be created to run on the server. A build-in cookie mechanism makes it much easier to maintain state (e.g., shopping cart contents) between client transactions as many of the details are abstracted to one or two cookie keys on the client that are look-up references to data in a database on the server side.

Getting Started

It is not hard to get started using ASP. In particular, it is not hard to create a stand-alone development environment. The author now uses his laptop computer running Windows 98 as a stand-alone development environment for ASP and for presenting lectures using HTML/ASP. Here is a short summary of how to get everything setup.

An Internet browser is required. Microsoft Windows 98 comes with Microsoft Internet Explorer already installed.

A way to create web pages is required. Microsoft FrontPage 2000 provides such a way, and is much more ASP-aware than FrontPage 98.

A web server is required. Windows 98 comes with PWS, or Personal Web Server, which is easy to install. FrontPage will easily publish content to a web site running FrontPage extensions. These are both easy to download from the Microsoft site and to install. PWS can actually be run as a web server, although security is limited, concurrent users are limited, and performance is not great. In addition, a fixed IP address is needed and a domain name, unless you want users to use the IP address to access your web server. For classroom development purposes, the computer name can be used within the local network running TCP/IP. So, if the computer name is **rmsnyder** on network **WIN**, then the web address **http://rmsnyder** can be used within the network **WIN**, even if the IP address is dynamically allocated (e.g., via DHCP).

A database is required for many systems, such as the project described here. Microsoft Access 2000 (or earlier version) can be easily used for the database setup.

Before using ASP, the author maintained a local web system on the hard drive of the laptop. This local web system was accessed via the **file:** service. In March, 2000, the entire web system containing about 1000 documents and 2000 HTML files (1000 generated as student-side small-print on-line notes and 1000 generated as teacher- side large-print in-class slides) was converted to ASP. Now, for classroom presentations, PWS must be running in order to process the ASP files. But, opportunities for dynamic and interactive web-pages and presentations have been greatly increased.

HTML, ASP, ADO, and SQL

The acronyms that are relevant to using ASP are as follows.

- HTML: Hypertext Markup Language
- ASP: Active Server Pages
- ADO: ActiveX Data Objects
- SQL: Structured Query Language

Entire courses, or mini-courses, could be taught on each of these. The following is a whirlwind tour for intuitive understanding purposes.

Here is a minimal HTML web page that displays the text, "Hello, World".

```
<HTML>
<HEAD>
<TITLE>text</TITLE>
</HEAD>
<BODY>
Hello, World
</BODY>
</HTML>
```

The following should appear at the top of an HTML/ASP page.

```
<%@ LANGUAGE="VBSCRIPT" %>
<% Option Explicit %>
```

The first identifies ASP as the scripting language used as other scripting languages such as JavaScript or even Perl could be used. The second is a VBScript statement that requires all variables to be declared before they can be used.

ASP statements are interleaved in the HTML to either generate HTML or to control if and how many times the interleaved HTML is generated in the HTML output stream that is sent to the client browser. So, the following HTML/ASP file would display the text "Hello, World" on 10 lines, one after the other.

```
<HTML>
<HEAD>
<TITLE>text</TITLE>
</HEAD>
<BODY>
<% Dim i %>
<% For i = 1 To 10 %>
 <BR>Hello, World
 <% Next %>
</BODY>
</HTML>
```

Note that ASP statements begin with a "**<%**" and end with a "**%>**". The **Dim** statement is used to declare variables, in this case, variable **i**. There is only one data type, the variant, so that the type of the variable need not be declared. The **For** loop outputs the HTML in the loop body (i.e., until the **Next**) 10 times. The line

**
Hello, World**

could be written as either

**<% Response.Write("
Hello, World") %>**

or as the shorter form

**<%= "
Hello, World" %>**

In addition to using conditional and loop statements, variables can be output.

ADO, for ActiveX Data Objects is a fairly simple interface that allows ASP to interact with databases, either on the web server or accessible from the web server (e.g., a SQL Server database).

One a database is accessed, SQL, for Structured Query Language, is often used to query and select records the database, add records to the database, delete records from the database, and to change records in the database. Obviously, this can get quite complicated and involved.

Nevertheless, the combination of HTML/ASP/ADO/SQL is quite powerful in the type of applications that can be built.

Future Directions

At the start of the year, the goal was to complete a usable software system. As time passed, more and more unknowns and uncertainties arose. Due to these unknowns and uncertainty in using new technology, a prototype rather than a completed software product was ultimately completed. Specifically, it was the first time that the author has used, let alone taught to students, the software including Microsoft FrontPage, Active Server Pages, SQL Server databases. The author created and published on-line notes on the Internet for the students to use on these topics. Next year, the next software engineering class will be able to improve the requirements, specifications, design, implementation, and maintenance as an existing project, while, at the same time, breaking new ground in creating a new project. This should provide, on a small scale, experience that is often only available in large-scale projects.

Summary

This paper has described the development of a class scheduling system that uses Active Server Pages technology and a (planned) SQL Server database. The results of the first year attempting a project such as this was very promising.

Recording Student Scores and Assigning Grades Quickly and Efficiently Using a Computer

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Abstract

The recording of student scores and assigning of grades remains an important aspect of teaching. A spreadsheet is just not convenient for the many things that need to be done. In addition to the expected features, the software system to be demonstrated includes stem-and-leaf histograms, support for student images, one-click access to teacher notes on the student, and features for transcription of grades for the Registrar. Scoring and grading strategies that have worked well in focusing students on learning versus scoring, the many ways in which scores and grades have been provided to students over the years, and how support for these strategies is built into the software will be discussed.

Introduction

When the author began teaching university level courses in 1984, it quickly became apparent that some way was needed to keep track of student scores so that grades could be fairly assigned. Initially, SuperCalc for CP/M was used, but if was found that there was too much functionality, to be discussed, that could not be captured with a spreadsheet. So the author developed a program called Scorge, written in REXX/XEDIT to run on a VM/CMS mainframe, to keep track of and process the needed information. After leaving graduate school in 1990, and with no VM/CMS mainframe available, the author again tried to use a spreadsheet, this time Quattro Pro for DOS. Even with programmed macros, the needed functionality was extremely difficult to obtain. So, in late 1990, in a few hours, a program in Turbo Pascal was developed to simulate a simple spreadsheet while adding the needed functionality. After that, functionality was added as needed and/or time permitted. In late 1998, the author began to collect and organize the functionality from the VM/CMS days that had been gradually ported to DOS in an ***ad hoc*** manner and began to create an easy-to-use software system, written in Delphi, that would run under Windows 95/98/NT. The rest of this paper describes some of the design, implementation, and usage considerations of that software system.

What Else Is Needed?

What is the functionality that is needed and why is a spreadsheet not suitable? There are at least three primary problems. The first problem is that it is too easy to make mistakes in a spreadsheet that are not detected. The second problem is that there are a large number of reports and features that are

difficult to capture in a spreadsheet. The final problem is that there are many interdependencies within the data model for the classroom administration problem that are not easily modeled and/or implemented with a spreadsheet.

The creation and analysis of an entity-relationship model for the classroom administration problem makes it very apparent that a non-flat database, such as a relational database, is required. On the other hand, implementing such a model in a database management system such as Access is often too much overhead, both in terms of creation time, maintenance time, and the overhead during usage. What the author has done is implement the needed database functionality in an easy-to-use software system that runs under Windows 95/98/NT. Even if the reader still insists on using a spreadsheet program to record scores and assign grades, the rest of this paper should be of interest as to the type of functionality that might be added to such a spreadsheet system. It is not impossible, just, in the author's opinion, difficult.

The software system will now be discussed, with simplifications to keep the discussion short. It should become apparent that the functionality provided would be difficult to achieve with a spreadsheet program without, of course, explicitly programming the system to be described.

Grading Strategies

Over the years, the author has attempted to develop fault tolerant grading strategies that, in addition to fostering learning, result in a final grade earned by a student that is less dependent on random fluctuations in scores than it is on the work put into learning the material for the course. The strategies used are intended to reduce pressure on the honest, hardworking, and motivated student while, as the semester draws on, increase pressure on the less-motivated student to learn and perform to a satisfactory level before the end of the final exam. These strategies will be mentioned as appropriate throughout the rest of this paper which discusses the software system.

Database Design

Here are some of the design considerations for the underlying database.

A semester contains all classes in a given semester. For example, **2000A** might be Spring 2000, **2000B** might be Summer 2000, etc. Each semester is mapped to the Registrar's designation for that semester.

A class consists of one or more sections, identified by a letter from **A** to **Z**, and mapped to the Registrar's designation for that section. Section **Z** is the "dropped" section.

A section consists of one or more students. Information such as last name, first name, nickname, student number, PIN (Personal Identification Number) for web page access to status information (scores, submissions, email, etc.), preferred email address, etc., is stored for each student.

Each class has user-specified number of class meetings. Each section has a date for each of the user-specified number of class meetings.

Each class has a number of user-specified categories that are used for the course. For example, **A** might be for assignments, **E** for exams, **Q** for quizzes, **F** for the final exam, **P** for presentations, etc. A user-specified goal for the number of points for each weight can be specified. An example of requirement categories might be as follows.

```
240 A Assignment (first try)
240 R Assignment (second try, redo)
120 P Project (written, oral)
40 Z Class participation
300 E Exam
300 F Final exam
---- - ----------------------------
1240 * Requirement categories
```

Each class has a list of class requirements based on a category. For example, **A1** might be assignment 1, **A2** might be assignment 2, etc. Points can be assigned for each class requirement. Here is an example of the actual requirements.

```
60 A1 Assignment #1
60 R1 Assignment #1 (redo)
60 A2 Assignment #2
60 R2 Assignment #2 (redo)
60 A3 Assignment #3
60 R3 Assignment #3 (redo)
60 A4 Assignment #4
60 R4 Assignment #4 (redo)
60 P1 Project (written)
60 P2 Project (oral)
40 Z1 Class participation
150 E1 Exam#1
150 E2 Exam#2
300 F1 Final exam
---- -- --------------------
1240
```

Each class has a user-specified formula that determines how the points for each of the class requirements are to be used to determine the overall score upon which the class grade is based. Here are some examples. The formula

A+E+F+Z

calculates a score out of 1000 possible points, not counting assignments that are redone. In the opinion of the author, an important part of completing assignments is not just solving a problem, but communicating the problem and solution. The appearance and formatting of the document, slides, etc., is important. But, it is hard to specify exactly what "looking good" is, and even if that is done, most students have trouble getting it right on the first try. Thus, if there are not too many students in the class, the author provides the opportunity to redo the assignment. Many students appreciate the opportunity, except for some students who feel that appearance of solutions is not important, do not like the additional work, etc. The formula

R+E+F+Z

calculates a score out of 1000 possible points, but does not count the original assignment in the case that a student does not redo the assignment. The formula

MAX(A,R)+E+F+Z

calculates a score out of 1000 possible points, including the maximum of each assignment with it's corresponding redo, if that redo exists. Another policy that fosters learning is to make the final exam cumulative and allow the final exam to raise any previous exam average to the final exam average in the instances where the final exam average is greater then an exam average. This creates a "nice" missed-exam policy that if an exam is missed, for any reason, then the final exam average is the exam average for the missed exam average. Thus, there is no special policy for student athletes, and the professor does not need to make judgment decisions on who has a valid excuse for a makeup and who does not. It is to the student's advantage to always take an exam, but, if it is missed, it means that the final exam is effectively worth more. Students who take the exam can feel a little more secure going into the final exam, while those students who have missed an exam, or done poorly on an exam, will feel increased pressure to do well on the final exam. The formula

MAX(A,R)+RAISE(E,F)+F+Z

adds the expression **RAISE(E,F)** which will raise each exam score that is lower than the final exam average to the final exam average and add the resulting scores.

A few comments should be made about the class participation score. From experience, the author feels that the class participation score is needed primarily to keep a small percentage of students from behaving in an unprofessional manner during class. Class participation is defined as both positively participating and/or contributing to the class learning process, which adds points, and as negatively participating and/or contributing to the class learning process. Thus, there is a legitimate method for penalizing any student who detracts from the learning process of the class. To reduce pressure on the student, the policy is that every student's class participation starts as their average for every other requirement for the course. If the student has added to the learning process of the class, additional points are added. If the student has detracted from the learning process of the class, points are deducted. Thus, if a student comes to class, sits there, and does nothing good and nothing bad, their final score is not changed. In terms of attendance policy, the author has had good success with the policy that if a student misses, or is late to, any class, the absence does not count against the class participation as long as an email message, encoded in a certain format, is sent to the professor within one week of the class in question. The formula

MAX(A,R)+RAISE(E,F)+F+AFTA(Z)

uses the expression **AFTA(Z)** to average requirement **Z** for total (i.e., total not including **Z**) and add that value and the value in **Z** to the total.

Of course, many other ways of specifying the formula for the overall score are possible, including options to drop the lowest scores in a category, multiply scores by a certain number, etc. In addition, individual requirements can be used rather than the requirement categories.

The Score Sheet

The score sheet appears as a spreadsheet in that it is a rectangular grid with a row for each student in the class, a column for each course requirement, and cells that contain the score for that requirement. A "**-1**" is displayed as a "**-**" and means that the student did not complete that requirement

(i.e., did not take the exam). On the other hand, a "0" means that the student actually completed the requirement but earned no points on that requirement. An earlier DOS version of the program actually pronounced the student's name as the scores were entered, but that feature has not been ported to the Windows version.

Columns that have formulas assigned to them are read-only and are calculated from the formula (e.g., using other columns). An override feature has not been implemented for individual cells.

Horizontal Histograms

One summary feature that provides considerable value is the horizontal histogram. A horizontal histogram in the form of a stem and leaf plot is used to show the results of a given requirement and provide a quick way to look at the distribution of a list of numbers. Here is an example for an exam.

```
100% 70| exam scores
-------+------------------------
86% 60|  60 62 63 65
72% 50|  50 53 55 59 59
57% 40|  40 42 43 43 43 43 44 44 45 45 47 47 47 47 47
43% 30|  30 31 33 34 35 35 37
28% 20|  20 21 23 26 27 27 28 29 29
14% 10|  15
0%  0|   7  9
```

In this case, there were 70 possible points and the breakdowns are given at intervals of 10 points (about 14.2% per interval). Each student's score on the exam is listed somewhere in the diagram.

A stem and leaf diagram (i.e., horizontal histogram with every score listed) is published for each exam and assignment and for the class totals. For exams, the stem and leaf diagram is broken down by individual parts of the exam. Thus, each student could see exactly where their score placed them for any given class requirement. The above policies play on the prisoner's dilemma problem, whereby if all of the students cooperate and do not resubmit or try that hard to do better on the final exam, the professor is bound to curve the grades for everyone. However, invariably, a few students try to do better, and as students start seeing their scores move lower in the distribution, they are motivated to make up some points to move their position upwards. Since the grading policy allows points to be made up as the semester progresses, there is increased pressure for everyone who did not do well the first time to do better, realizing that it is not over until the semester is over. Even with a few weeks to go in the semester, it is not the "professor's fault" for the student's poor performance, since a good performance on the final exam and resubmissions of the assignments.

Assigning grades

At the end of the semester, an overall score can be determined from the individual scores, as can an overall histogram. At this point, it is necessary to assign grades. Actually, the author always states that a grade is not a grade "assigned" by the teacher, but a grade "earned" by the student.

A decision support system, designed by the author, makes it easy to assign letter grades using the letter grade system of the current institution. A chart is created showing the distribution, along with the current GPA as each group of grades is assigned.

Unfortunately, most institutions then require that the information be hand-copied onto the grade forms provided by the Registrar. The system makes it easy to sort the students into that order.

Summary

This paper has presented some interesting aspects of recording student scores and assigning grades quickly and efficiently using a computer and discussed some grading and scoring policies that the author uses to promote learning.

Faculty and Staff Training for the New Millennium.

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Abstract

Computer Technology is changing very rapidly. It is virtually impossible to keep abreast with the technology these days. Without proper training of faculty, staff, and students it is not possible to implement new technology successfully. Many people do not like to learn new technology. They feel that whatever they are using right now is sufficient to do today's work. They would like to live the concept of *"If it is not broken do not fix it"*. In today's society if you do not use the contemporary technology you will lag behind.

So how do we motivate faculty, staff, and students to embrace the new technology? Again, if they do not use the technology no matter how much money you have spent on upgrading the equipment it is worthless. In this paper we will share some techniques that we use on our campus to conduct training sessions for faculty and staff. The training sessions involve using small groups and conducting shorter sessions with demonstrations from users (not necessarily the Information Technology group) who have embraced the technology.

Introduction

Indiana University Purdue University Columbus (IUPUC) campus IUPUC is part of the Indiana University regional system. Purdue University School of Technology at Columbus Indiana (PST) is a partnership with IUPUC. The Purdue School of Technology programs are offered on the IUPUC campus. There are approximately 1900 students at this campus between IUPUC and Purdue students. There are approximately 57 faculty and staff on campus. The combined facilities of IUPUC and Purdue have five computer labs and approximately 105 computers available for the students. There are approximately 305 computers on campus for faculty and staff. Most of the computers are running Windows NT Workstation 4.0 and some run Windows 98.

All the computers in the campus are networked and have access to the Internet superhighway via T-1. Most of the computer labs are equipped with LCD projectors. One of the labs is even equipped with LinkSystem, which allows us to take control of all the student-computers and display instructor's monitor image and video from a VCR quickly. During the lecture the instructor broadcasts his lecture materials to the projector and to all the student-monitors, and during the test the student-

computers are blanked. This forces students to focus on the class material rather than cruising the Internet and performing other tasks.

Students, faculty, and staff utilize the equipment on a daily basis. Software and hardware are constantly being upgraded by Information Technology personnel. These upgrades or changes in available hardware and software require training to effectively utilize these tools. As with most universities, money for training is very limited, almost non-existent in some cases. Universities like IUPUC must develop low cost effective ways to train faculty, staff and students. In the following paper we will look at what we have done at the IUPUC campus, sharing some of the successes and failures in our attempts to effectively train users on hardware and software on campus.

Approach to training

Faculty and staff training can be done in several ways. People can be sent off to training for appropriate hardware and software. To do this with all people needing training is costly. In some cases an individual may be sent to training and then return and train faculty and staff at the university. This works fairly well. A good thing about this type of training is that faculty and staff can learn a great deal of information in a short amount of time. They have ample time to cover most of the material and concentrate on learning material as they are isolated from their day-to-day work. They will be able to cover a great deal of material on a particular technology, for example, Word 2000. The negative side of this approach is the cost and absence of staff and faculty during training. Since a glut of information is fed to staff and faculty during this short period of time, it is very unlikely that they will remember everything they learn during the crash course. Only a limited number of people can be trained at a time.

On the other hand, training can be delivered at home almost free of cost and involve almost no time away from the job. At the Columbus campus we have created a session called "Learn&Share", a once a month training/workshop. These sessions are for all the faculty and staff who want to learn or share their experiences with a particular topic or software. For example, using Microsoft Word 2000, PowerPoint 2000, Outlook 2000, etc. The session lasts anywhere from half an hour to an hour. It is conducted in a well-equipped lab with 19 computers.

These sessions can be developed in any format. We chose to limit these to 30 to 60 minutes because we want to give the impression that it is not a regular class but just a workshop focusing on a particular topic for that particular day. We try to keep it "short and simple".

Who do we get to teach classes? This can be solved in a variety of ways, usually the technical personnel responsible for Information Technology will conduct the classes. Since these are "Learn&Share" sessions anyone is welcome to share their experience.

We have found that this approach is very effective in implementing new technology as well. As an example, before we move our email client from Netscape to Outlook 2000, we were able to demonstrate the advantages of using Exchange server for email as opposed to POP server and using Outlook 2000 as an email client. The look and feel of Outlook 2000 is much different than Netscape email, most users were eager to change to the different technology because it provided flexible access

to their email, attachments, calendar, contacts, tasks, and journals, etc. Using web access Exchange accounts users are able to check their mail without any special email client software.

Currently, we are limited by the hours and days the labs are available for such workshops. In our opinion these sessions are very effective in half hour session. Sessions can even be conducted during lunch hour as "brown-bag" lunch workshops.

Examples of Courses

We have conducted courses at multiple levels of competency. Some of the workshops we have conducted include sessions in:

- Windows 95/98/NT
- Word 2000
- Excel 2000
- Outlook 200
- PowerPoint 2000
- Access 2000.

Attachment 1 lists some of the topics covered in the short courses. We try to offer many sessions at different times because of the varied schedules of our faculty and staff. Since these are very short sessions it makes it easier to schedule in the labs and less time is required to prepare for each session.

Evaluation of What We Have Done

There hasn't been a formal evaluation of the courses but general comments have been favorable. We have been using this approach for the past six months. Attendance has varied depending on the topic, but participants have been very active in the workshops. All the participants liked the fact that they did not have to spend hours at these workshops. They could easily manage to fit these short training sessions in their busy schedule. Since it does not cost the institution any money anybody can attend and enjoy the hands-on training. Because everyone knows each other things go very smoothly and users are not afraid to ask questions and share their experience. So far, we've only had positive responses in conducting these sessions. For the session leader the time involved has not been overwhelming. On average the about one hour of preparation is needed for each thirty minute session. We would like to encourage more faculty and staff to lead sessions in the future, since most sessions to date have been led by the Information Technology group.

Where Do We Go From Here

Many times there may situations where Information Technology personnel require training. In that case, it is best to send that person to the training so that that person can come back and share the knowledge with the rest of the faculty and staff. At our site the Manager of Information Technology spends a lot of time learning and experimenting with new technology to make a significant contribution to "Learn&Share" program. Why would this person do this? First, this person does not need to repeat the same thing over and over to many faculty and staff. This saves a lot of time. Second, it forces the Information Technology personnel to keep abreast with the state of the art technology.

What do we plan to do in the future? We plan to inform everyone about what is happening and gather user's problems before the workshop. This will ensure that the instructor has ample time to solve the problem and demonstrate it during the training. It is also a good idea to make all the material available at the web site for future reference in an easy to find manner.

Conclusion

Conducting in house short-period multiple training / workshop sessions are the best for both the instructor and the users. Instructors do not need to prepare a lot of material. It can be conducted once a week, once every two weeks, or once a month, depending upon the need. This also creates a cohesiveness among the faculty and staff. "Learn&Share" improves the communication among all the participants. It allows attendees plenty of time to digest newly learned materials, and implement it at their own pace. If they have questions they can ask other users for any assistance. Finally, this method of training provides a low cost method of providing training to a large number of faculty, staff, and students.

Attachment 1

Content of several short courses offered:

Intro to Word2000:

- How to format word document
- How to use bullets
- How to use spell checking and thesaurus
- How to change fonts, sizes
- How to create tables
- How to capture screen shots and insert in a word document
- How to insert clip arts, video clips, and pictures
- How to convert Word document to an HTML document for WWW

Advanced Word2000:

- How to draw tables of any type
- How to use borders around tables, cells
- How to use colors in tables
- How to Create FlowCharts
- How to use Drawing tools
- How to insert excel worksheets
- How to use Format Painter

Intro to Access:

- How to create a table and enter data.
- What is design mode and Open mode.
- What are rows and columns.
- What is query and how to perform query.
- What is Form and how to create and maintain a form.
- What is Report and how to create a report.

Students Evaluate the Success of Condensed Format Computer Courses

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Introduction

Purdue University and Cummins Engine Company, Inc. formed a partnership, which consisted of retraining Cummins employees to become Oracle database developers and administrators. This program is known as Advanced Information Technology Training Program (AITTP). This paper summarizes a survey that was completed by the past graduates of this program. The purpose of the survey was to determine the effectiveness of a condensed computer course format.

Background of AITTP

The Advanced Information Technology Training Program (AITTP) is a program where Purdue University offers 6 credited courses delivered in a compressed format for Cummins Engine Company employees and people from the community. Cummins is responsible for filling the seats in the program with a maximum of fifteen participants selected to participate in a session. Each course is delivered in 1 to 1 ½ weeks. Students take one course at a time and typically meet Monday through Friday from 8:30am till 5:00pm. Since the initial offering in 1997, the program has been presented twice a year, in the spring semester and during the summer break. Cummins and Purdue are in the middle of their third contract to continue this venture that will offer sessions up to the year 2002. The schedule does not follow the normal university schedule since classes are compressed and the entire program takes approximately twelve weeks from start to finish. Once Cummins students finish this program they go back to Cummins and apply their skills. Their training however is not finished, students then can select a path, either as Oracle Database Administrator (DBA) or Oracle developer and continue on to take Oracle classes in order to get an Oracle Masters, which is an Oracle certificate program.

Courses for the program were developed and delivered by full-time Purdue University faculty. Faculty from several Purdue University campuses have delivered courses in the program. Faculty teaches a regular semester schedule. Each class is normally compensated by one-month salary.

Courses for the program either come from the regular courses in the CPT degree program or specially designed courses (denoted by X99 in the course number). Grades are based on the following straight percentage scale: 90 -100% = A; 80 - 89% = B; 0 – 79% = F. The following are courses offered in the program:

CPT 199 - Client/Server Architecture
CPT 299D - Database Programming (Oracle SQL)
CPT 275 – Object-Oriented Programming (Java)
CPT 499 - Database Design
CPT 482 - Database Implementation (Oracle PL/SQL)
CPT 487 - Database Management

Students in the AITTP program are selected to participate based on both internal and external searches conducted by Cummins staff. Internally, candidates are selected from Cummins facilities throughout the world. Externally, participants are recruited out of local newspapers and with the assistance of the Indiana Office of Workforce Development. Typically programs are made up of approximately 40% new hires. Cummins has control over the students selected for the program and has the right to sell seats in the program to non-Cummins employees. In the three years of the program there have been sixty Cummins participants and Cummins has sold five seats to companies in the local community. With the program set up in a "boot camp" environment (as the Cummins' staff referred to it) it was essential to select highly motivated students to participate in the program. Students go through the program in a cohort group. New hires were required to pass the entire program with a B grade or better, or be subject to termination. Existing employees were required to pass all courses to stay in the program or they must return to their old job. Students also agree to stay with the company for two years after completing the program or they must repay Cummins a fee ranging from $5,000 to $20,000 for the program. Since the beginning of the program the prerequisites for students to enter the program have changed. For students to enter the program today the students must qualify using at least one of the three following tracks:

- AS in Computer Science or Computer Information Systems with a 3.2 overall G.P.A. and 3.5 core G.P.A., along with programming course or two years programming work experience.
- BS in technical area with programming courses or two years programming work experience.
- Two years programming experience.

Student Survey

The AITTP program is three years old. There have been six cohort groups graduate from the program since the first class finished in 1997. With over sixty graduates fulfilling their requirements for the program it seemed like a good time to survey the students about the program. Is the program accomplishing the goals that were initially intended? Is the programming fulfilling the needs of the students? Can the success of the program be built upon and even copied at the university for regular classes or other universities? Following we discuss the results of the surveys.

Students from Cummins who participated in the program were surveyed, including the summer 1999 session. The survey is included as Attachment 1. The survey was conducted in December of 1999. Students had at least four months on the job after graduating from the program. This included sixty Cummins employees. Of the sixty, five have left Cummins and we received responses from forty-six or approximately eighty-four percent of the students still employed by Cummins. Cummins sold six seats to local companies over the three years, however, these students were not a part of the survey.

Students were surveyed concerning demographics, the courses and expectations of the program and value of the program as an investment in their careers. Figure 1 is a copy of the survey questions given to the students.

Survey Results

The students were asked questions about their educational background. Overall the students were highly educated with almost three-quarters of the students coming into the program with a Bachelor's of Science or Master's of Science degree with Technology and Business being the largest disciplines. According to Cummins approximately forty percent of the participants were new hires when entering the program, however almost twenty-four percent of the students have ten years or more experience. Most of the graduates of the program went on to positions as Database Administrators (DBA) or Application Developers. Following are the results of questions concerning the students' background in tables 1-4.

Student's education

Associate	Bachelor	Master
26.7%	60.0%	13.3%

Table 1

Student's degree in

Engineering	Business	Science	Technology	Other
11.9%	28.6%	14.3%	35.7%	9.5%

Table 2

Student's time at Cummins

Less than 1 year	1-5 years	5-10 years	10-15 years	Greater than 15 years
15.2%	47.8%	13.0%	8.7%	15.2%

Table 3

Student's job prior to and after program

	DBA	Programmer	Application Developer	Project Manager	Other
Prior to program	3.9%	15.7%	29.4%	11.8%	39.2%
After program	26.0%	6.0%	48.0%	10.0%	10.0%

Table 4

Students were surveyed on the effectiveness and their general perceptions about the program they participated in. Although the format of the program has changed slightly over the three years, it is still a compressed schedule of six courses offered back to back. The main difference is that the initial format consisted of 8 weeks of courses and now the format consists of 12 weeks of courses. Students were surveyed on a Likert scale concerning aspects of the program. Table 5 is the results of the survey.

	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
I was adequately prepared (experience/academically), to enter the program.	60.0%	35.6%	2.2%	2.2%	0.0%
I was aware of the time commitments necessary before starting the program.	48.9%	37.8%	6.7%	6.7%	0.0%
I feel the courses offered in condensed format were effective.	22.2%	46.7%	22.2%	8.9%	0.0%
I would enter the program again knowing what I know now	45.8%	37.5%	12.5%	2.1%	2.1%
I feel this program has significantly increased my technical skills.	48.9%	46.7%	4.4%	0.0%	0.0%

Table 5

Students were also questioned about the amount of homework involved in the program both during the week and on weekends. During the week the vast majority (approximately sixty-seven percent) spent three to four hours a night on homework assignments. On the weekends, the majority of students spent in excess of four hours on homework assignments. Students were also surveyed about the courses that were most helpful in their current job positions. They were asked to answer the question for database related courses and non-database courses. There were four database classes offered in the program, CPT 299D - Database Programming, CPT 499 - Database Design, CPT 482 - Database Implementation (Oracle PL/SQL), CPT 487 – Database Management . Of these classes the CPT 299D SQL class and CPT499 Database Design were rated as the most beneficial to students on their current position. There were two non-database courses offered: CPT 199 - Client/Server Architecture and CPT 275 – Object-Oriented Programming (Java). Over eighty percent of the students believed the CPT199 network class were the most beneficial class in their current position. The other class in the program is a project class involving Java and SQL.

Finally students answered OPTIONAL questions about how the program has affected their income and marketability. Table 6 and 7 summarize those findings.

	0-2%	3-4%	5-6%	> 6%	Not Applicable
Raises since finishing program	10.8%	43.2%	8.1%	13.5%	24.3%
Average raise prior to entering program	5.6%	47.2%	5.6%	13.9%	27.8%

Table 6

	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
I feel my compensation is comparable to others in the industry.	2.7%	18.9%	29.7%	37.8%	10.8%
I feel that by completing this program I have increased my marketability.	43.6%	46.2%	10.3%	0.0%	0.0%
I would consider leaving Cummins once my two-year commitment is completed.	13.2%	26.3%	36.8%	18.4%	5.3%

Table 7

The last question of the survey was an open-ended questions asking the students what they would change about the program. For the most part all of the responses were very positive. The two recurring themes for improvement/change were to drop the JAVA class since it is not being used on the job, and include more Oracle tools. These two findings are further supported by a survey, conducted in the spring of '00, of the supervisors of the AITTP. The supervisors of the graduates reiterated the need for more Oracle tools and less JAVA emphasis.

Evaluation of Survey

The results of the student survey were very interesting. Students were well educated with a diverse background in their education and work experience. The program also recruited from a diverse group, in terms of experience, with many new hires and employees ranging from less than a year to over fifteen years at Cummins. When students finished the program they typically become Oracle DBA's or Oracle Application Developers. This is consistent with the initial goals set out when Purdue University and Cummins Engine Company, Inc. developed the program. It is important to note that students were prepared and aware of the large time commitments necessary to enter the program with most students spending up to four hours a night on homework during the week and over four hours over the weekend.

The question that arises is, is the program a benefit to the students? In order to assess this, the question needs to be broken into two areas: enhancement of the student's skills, and compensation of students after finishing the program. The survey tends to support that the program was a benefit to the students in terms of enhancement of their skills. However the program was not a benefit to the students in terms of their perceptions of their compensation. Over eighty-three percent of the students would enter the program again knowing what they know now and sixty-nine percent of the students believe the compressed format was successful. In the area of enhancement of skills students overwhelmingly felt that their technical skills were increased along with their marketability. Several questions on the survey addressed the issue of compensation. Actual raises for employees showed no real trends as the highest group was virtually unchanged and only minor differences were found in the other groups. Employees have no control over raises but their perceptions of compensation are diverse. Only twenty-one percent of the students feel their compensation matches industry. Over

forty-eight percent of the students feel their compensation doesn't match industry , with the remaining students undecided.

One of Cummins goals was to re-skill the existing workforce. The idea behind this was to take employees that are satisfied working at Cummins and retrain them in areas of need at the company. The information technology industry typically has a high turnover rate and Oracle skills are in high demand. Of those surveyed approximately forty percent of the students said they would consider leaving Cummins and twenty-four percent said they would not consider leaving Cummins. Of the sixty students from Cummins, five employees have left. Of those five, four were new hires in the program and one was an existing employee. The existing employee was with a subdivision that was sold off and the employee chose to stay with the company buying out the subdivision. Cummins information technology (IT) annual turnover rate is slightly over fifteen percent. The rate for students in the program appears to be below the corporate turnover rate. This is especially true for existing hires that make up sixty percent of the participants and have only lost one employee over three years. This could be held artificially low by the two-year period students must stay after completing the program or buyout of up to $20,000. At this time two of the classes are eligible to leave without penalty (approximately thirty students). Interesting enough there has been one student who has paid the penalty for leaving before the two year time period.

Implications for the University

There are several implications for the program. This type of program with compressed classes has been used as a model in the Computer Technology Department for working with industry. The year after this program was developed another similar program was developed at the West Lafayette campus. The money generated for the university, the flexibility it offers business, and the extra income it offers faculty have all been cited as benefits to the business and industry.

Even if a program like this is not implemented it can have implications for the university. Courses open to the regular student body have taken advantage of this compressed format. The past three years the CPT department has offered several classes in a compressed format. The format has been a class meeting for eight Saturdays (one half a regular semester). Has it been successful? If enrollment is an indicator, enrollment for courses has increased each time from twelve the first time to eighteen this semester for an introductory computer class. An informal survey of students in the class offered this spring indicates that students were not aware of the extra work involved and generally signed up because of the compressed schedule. Students like the flexibility the course offered. The dropout rate is much higher than the motivated group from the AITTP program (only one student in the three year history of the program), from approximately one half the class during the first offering to two this semester. One advantage the AITTP program has is that students go through the program as a cohort group as opposed to students in the regular classes who are not a cohort group. This really seems to help students in the AITTP program. By having a group going through the program, students are able to draw upon fellow students for help and encouragement.

These regular classes are being offered in a less compressed schedule than the AITTP program. This summer for the first time the CPT department will offer the introductory computer class in summer school in six days much like the AITTP program is offered. Further implications include a potential weekend compressed program that is being studied to offer flexibility to the students and better utilize

the building. This program would be offered to CPT Associate's degree students in a compressed format of classes that would meet on Saturdays for approximately two years. Students would go through the program like the AITTP students as a cohort group.

Further assessments about the AITTP program and the CPT compressed format will need to be studied in order to make continuous improvements to the programs. By doing so, the students, the university, and industry can create a win/win/win for all.

Attachment 1
Student Survey

Please read the following survey and answer the questions on the attached scantron sheet. When you are finished, please place the **survey** and the **scantron** sheet in the self-addressed, postage paid envelope. The information is **CONFIDENTIAL.**

DEMOGRAPHICS

1. What is your degree?
A. Associates B. Bachelors C. Masters D. Doctorate

2. In what discipline is your degree?
A. Engineering B. Business C. Science D. Technology E. Other

3. How long have you worked at Cummins?
A. < 1 year B. 1 - 5 years C. 5 - 10 years D. 10 - 15 years E. > 15 years

4. What type of job were you in prior to entering the program?
A. DBA B. Programmer C. Application Developer D. Project Manager E. Other_____
(if your answer is other, please code E on the scantron sheet, as well as, write the job title on the line provided)

5. What type of job are you employed in since completing the program?
A. DBA B. Programmer C. Application Developer D. Project Manager E. Other_____
(if your answer is other, please code E on the scantron sheet, as well as write the job title on the line provided)

INFORMATIONAL QUESTIONS

6. I was adequately prepared experience/academically to enter the program.
A. strongly agree B. agree C. undecided D. disagree E. strongly disagree

7. I was aware of the time commitments necessary before starting the program.
A. strongly agree B. agree C. undecided D. disagree E. strongly disagree

8. Which database courses do you feel are most useful in your current position? (please mark all that apply)
A. database design B. SQL C. Database Tuning D. Database Admin.

9. Which non database courses do you feel are most useful in your current position? (please mark all that apply)
A. Introduction to Data Communication B. JAVA

10. I feel the classes offered in the condensed format were effective.
A. strongly agree B. agree C. undecided D. disagree E. strongly disagree

11. How much time did you spend each night doing homework/reading?
A. 0-2 hours B. 3-4 hours C. more than 4 hours

12. How much time did you spend on the weekends doing homework/reading?
A. 0-2 hours B. 3-4 hours C. 5-6 hours D. 7-8 hours E. > 8 hours

13. I would enter the program again knowing what I know now.
A. strongly agree B. agree C. undecided D. disagree E. strongly disagree

14. I feel this program has significantly increased my technical skills.
A. strongly agree B. agree C. undecided D. disagree E. strongly disagree

15. I plan to use some/most of my 18 credit hours to pursue a degree?
A. Yes B. No

OPTIONAL QUESTIONS

The following questions are purely optional and will be used for research by Purdue University. This information WILL NOT be supplied to Cummins Engine Co., Inc.

16. This program has increased my earning potential at Cummins.
A. Yes B. No

17. My annual raises since finishing the program have been:
A. 0-2% B. 3-4% C. 5-6% D. greater than 6%

18. My annual average raises for the 3 years prior to entering this program were:
A. 0-2% B. 3-4% C. 5-6% D. greater than 6%

19. I feel my compensation is comparable to others in the industry.
A. strongly agree B. agree C. undecided D. disagree E. strongly disagree

20. I feel that by completing this program I have increased my marketability.
A. strongly agree B. agree C. undecided D. disagree E. strongly disagree

21. I would consider leaving Cummins once my 2-year commitment is completed.
A. strongly agree B. agree C. undecided D. disagree E. strongly disagree

22. What would you change about the program. (please write your response on appropriate space on the scantron sheet)

Real Time Integration of the Web with Student Information Systems - Strategic Advantages in Recruitment, Advisement and Enrollment Services

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Abstract

As prospective students, parents, current students, alumni, faculty and administrators look more toward seeking and processing information via the Internet, integration of the student information system with the Web has become critically important. This presentation will demonstrate how these web-enabled applications provide strategic advantages in recruitment, retention and student/faculty services. Highlighted will be the real-time web access for academic plan, degree requirement, and "what-if" academic scenarios for faculty/advisors and students.

(Frank's paper was not available at the time the Proceedings went to press. He will supply copies of the paper at his talk or give a web address at which it can be found.)

Integrating an Event Calendar into the Campus Web Site

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Abstract

Event notification is a concern at many colleges. At Wabash, campus events were publicized in many ways, but there was no single source to see everything that was happening on campus. To address this problem, we developed a campus-wide calendar web application using Cold Fusion and SQL Server. This calendar shows all campus events in a variety of formats. In addition, we have pushed information from the calendar onto other web pages, seamlessly integrating calendar information into the entire Wabash site. The paper will discuss the development of our calendar site, its integration with the main web site, the calendar's impact on campus, and some of the problems-technical and political-we had to overcome.

(Brad's paper was not available at the time the Proceedings went to press. he will supply copies of the paper at his talk or give a web address at which it can be found.)

The Special Education Institute: A Partnership Supplying Special Educators for the Old Dominion

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Longwood College is a small public liberal arts college located in south central Virginia. Historically known as a teacher preparation institution, Longwood has produced outstanding teachers for the Commonwealth of Virginia for over one hundred-fifty years. To maintain its position as a leader in the preparation of well-qualified teachers for all contents, levels, and categories of instruction, Longwood has participated in several initiatives over the past ten years. The Instructional Technology Teaching and Learning Program and the Special Education Online Institute are two of the more recent endeavors.

The Instructional Technology Teaching and Learning Program:

The Instructional Technology Teaching and Learning Program (ITTL) was established in 1995 at Longwood. Its goal was simple--to provide technology training and expertise to the faculty who would integrate it appropriately into the curriculum. The ITTL program aimed to accomplish this integration in several ways. The first element of this integration was the hiring of a director who would assist and train the faculty in the use of instructional technologies. This Director in turn hired several staff members to assist him in preparing the faculty at the College. Preparation took the form of workshops throughout the year; mini-grant programs designed to get technology into the hands of the faculty desiring to integrate technology into the curriculum; reassign-time competitions; guest speakers on campus; brown bag lunches; and satellite conferences brought to campus.

Workshops offered to the faculty were designed to inform them of technology available for instruction. Outside speakers from K-12 came to the campus to demonstrate for faculty what was happening in Commonwealth of Virginia school divisions. This input from the school divisions was critical in light of our mission as teacher trainer for Virginia. Additional workshops were offered in Hypertext Markup Language, Netscape Composer, Powerpoint, Excel, Access, and graphics packages such as Adobe Photoshop. Mini-grant competitions were held at least once every academic year. Again the goal was to get the technology into the hands of users. While Longwood is committed to guaranteeing that all full time faculty have at least a pentium 166 (current standard) with 32

megabytes of memory, the ITTL program was used to put higher end software and hardware into the hands of the faculty who would make the best use of it. Faculty also competed for course release each spring semester. The goal of this reassign-time was to encourage faculty to retool a course currently "on the books" for online instruction using the available technologies on campus. In addition, the ITTL program brought to campus high-end technology users from other Virginia institutions to demonstrate how technology improved their instruction. The ITTL program also sponsored monthly "brown bag" luncheons in which instructional technology issues were discussed in an informal setting. These luncheons were called the Academic Classroom of the Next Century" (ACNC) and were also a focal point for Longwood College faculty to demonstrate how they were using technology in instruction at the College. Finally the ITTL program sponsored four satellite conferences offered by PBS each academic year.

The Special Education Institute

In 1989, the Virginia Department of Education offered grants to the state's teacher preparation programs to provide "retraining" for general education teachers to help meet the demands for additional special education teachers across the state. Longwood's initiative that received State funding for several years, enrolled participants in a three-week intensive summer session where they could earn three to six graduate credits to meet the state's special education teacher licensure requirements. Several hundred teachers participated in this program and obtained either special education endorsements in learning disabilities, emotional/behavior disorders, or mental retardation, or the Curriculum and Instruction Specialist: Mild Disabilities master's degree. Satisfaction with this program was extremely high, with teachers coming from all over the state to participate.

In 1998, with the encouragement of the College's Instructional Technology Teaching and Learning Program, a new direction in presenting the Special Education Institute was proposed. Utilizing the technology that had recently been made available for faculty use in both the preparation and delivery of instruction using technology, the Special Education Online Institute was born. Two Special Education faculty members were recipients of the ITTL mini-grant for reassigned time to retool traditional courses. The Special Education Faculty at Longwood College believes that much valuable instruction takes place when faculty and students interact face to face and that we never want to eliminate that aspect of our programs. We came to see, however, that much valuable learning could take place when students work independently, utilizing information and experiences on the Internet. Thus, we combined two valuable instructional tools: Internet and classroom.

The first year of the Special Education Online Institute, four graduate level courses were developed as online courses. Faculty could not lose sight of the fact that these courses were to be comparable to the more traditionally delivered graduate courses in the amount of information presented and in the demands placed on the students. These were, after all, courses that might count toward a master's degree at Longwood College and must be the equivalent of courses offered in the regular semester of the school year. The standard requirements included in these courses were textbook reading and activities, research projects, and class discussions. The Internet activities included discussion groups utilizing a class listserv, searching the World Wide Web for information and resources, and submission of papers and projects via email.

In April, 1998, students participated in Registration and Orientation. They met with instructors and received course information, and had a workshop in the computer lab on how to access the course

material and conduct web activities. For the next two months, these students worked independently to complete their course requirements. The plan was for all course requirements to be completed prior to their coming on campus in June. Of course, problems were encountered. The greatest problem was the lack of experience the students had in using technology. Although most had "access" to computers either in their schools or in their homes, their experience using a computer for anything other than word processing was little to none. The advantage these students had was their willingness to learn. And, of course, we had problems with getting the listserv to work correctly, getting the login and password to work for each of the courses, and finding attachments containing students' assignments. The students came to campus at the end of June for a week of more traditional class activities. Professors lectured, students worked in small groups, and exams were given. That first year, we (students and professors alike) learned a lot about ourselves and our abilities to work with a new medium of instruction and learning.

The 1999 Special Education Online Institute offered four new courses with two new professors preparing and utilizing the web-based format. Several things changed in 1999. We met later in the school year (June as opposed to April) for Registration and Orientation and students came on campus later in the summer (July as opposed to June), giving them more time to work on their independent learning. We no longer password-protected the course material. It was out there on the Web for anyone to see. In addition, the College had installed Web Board software that was much more user friendly. Our class "discussions" became easier and more frequent.

The Special Education Online Institute will be upgraded further this year with the use of a course management system designed by Blackboard.com.[1] Up until this point, Special Education faculty teaching on-line had to have at least a limited knowledge of HTML. There was no self correcting and graded on-line testing available, and threaded discussion and interactive chat were accomplished using a separate system with a completely different graphical interface. In addition, the interface and navigation in each course in the Institute was different one from another. The use of CourseInfo will completely change this. The look of each course will be identical. This is critical if the students are to find that moving within a course and from one course to another is simple. In addition, CourseInfo integrates chat, threaded discussion, on-line testing, and password protection into one, easy-to-use package. Faculty no longer need to know HTML as the web-based CourseInfo integrates virtually any document format into its web interface.

Two years of Online Institute have been very positively received with more and more individuals wanting web-based courses to be offered year round. Participants have stated that they work at least as hard for an online course as they do for more traditionally offered graduate level courses. They also have indicated that they feel more comfortable and confident using computers and the Internet as a result of having completed the Online Institute. This benefit for teachers is especially important since, in Virginia, teachers must possess technology competencies in order to be licensed to teach and in order to maintain their jobs in the teaching profession.

[1] More informaton about Blackboard.com's course management software called Courseinfo may be obtained at the following URL: http://www.blackboard.com/

The Power of an Information Technology Handbook

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Abstract

Pikeville College, a small, four-year liberal arts college in the heart of Appalachia, recently developed and instituted an *Information Technology Policies and Procedures Handbook* as a way to ensure the continued offering of consistent, modern, and innovative services hinged upon the College's growing telecommunications and computing infrastructure. With the demand for advanced computing skills increasing in both the professional and educational sectors, the Office of Information Technology at Pikeville College (PCIT) felt it was crucial to institute bold initiatives in order to remain competitive for potential students, and for their graduates to remain competitive in the workplace. By making available both a printed and an online version of the *Handbook*, PCIT hopes that they will equip their staff and students with the skills and understanding to use computers effectively both in their time at Pikeville College and beyond. This paper, and the accompanying presentation, will discuss the process and implementation of the *Handbook* and provide a breakdown of the various sections within.

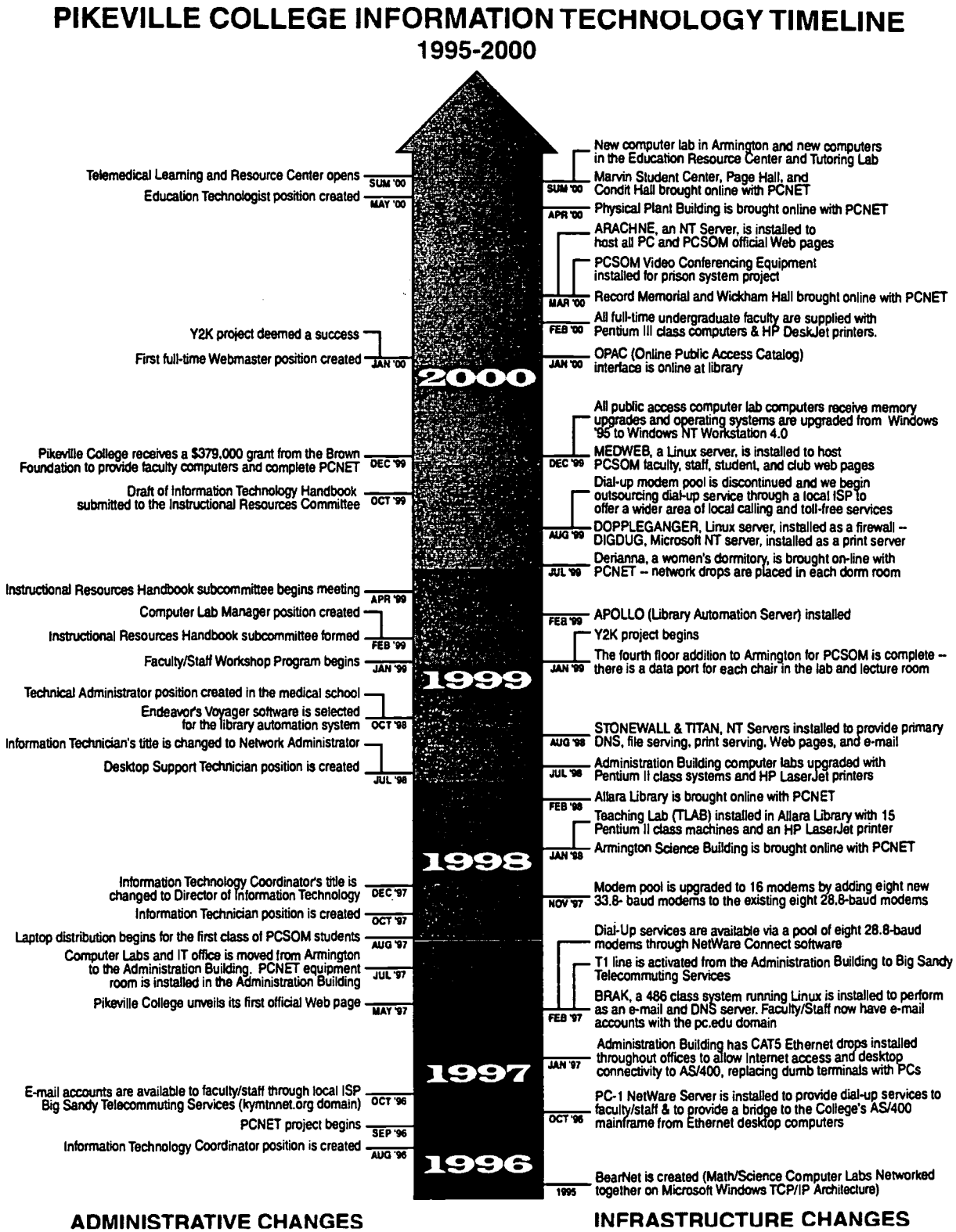
A Brief History of Pikeville College

In 1883, the Reverend Samuel Paul Hendrick had a yellow buggy, a small church in the village of Pikeville, and a vision. He dreamed of a Christian school for the financially disadvantaged mountain youth of central Appalachia who were deprived of an education. The fruition of that vision came to pass in the fall of 1889, when the Pikeville Collegiate Institute was founded. Over the next century, this institution with such humble beginnings evolved into Pikeville College, which is now a four-year liberal arts college with a school of osteopathic medicine with expected enrollments this fall of approximately 800 undergraduate students and 240 osteopathic medical students.

Inasmuch as Central Appalachia has historically been geographically and financially disadvantaged, Pikeville College has always strived throughout its long, rich history to meet the needs of its region by offering curricula and other services to professionally and culturally enrich its outlying communities. Coinciding with the beginning of a phenomenal period of innovation in both technology and education in the mid-1990's, Pikeville College began to plan and build its technology infrastructure.

Pikeville College Embraces Technology

As exhibited in the following timeline, Information Technology first found its way onto the Pikeville College campus in very modest fashion and has expanded to a level comparable to that of many small institutions of similar size and status.



As shown in the representation above, where once only a mainframe and terminals existed, Pikeville College developed a robust, distributed network with significant communication capacity. However, as the resources and responsibilities of the College's Office of Information Technology continued to grow at an increasingly frantic rate, it became apparent that there was a critical need for a cohesive, all-encompassing *Information Technology Policies and Procedures Handbook* to provide a set of guiding principles for the development and administration of the College's technological resources. Further, this document would need to be very dynamic in nature to keep pace with the rapid changes that have been characteristic of computer technology. Before Pikeville College, as an institution attempting to stay competitive with its peers, can accept the responsibility of continual renewal and periodic reevaluation of IT needs, this document must be in place to serve as a tangible point of reference.

Current Projects at Pikeville College

At the time of the writing of this paper, Pikeville College is amidst some exhilarating technologic innovations. The campus network, PCNET, is scheduled to be finally complete by this fall, with every building on campus interconnected with fiber optic cable. Additionally, during the spring semester, each Pikeville College full-time faculty member received a new desktop computer and color inkjet printer.

Perhaps the most intriguing technological innovations on campus involve the College's School of Osteopathic Medicine. A state-of-the-art Telemedical Learning and Resource Center is slated for completion this fall, which will allow medical students to utilize cutting edge technology to, for example, remotely diagnose and treat prison inmates under the supervision of PCSOM faculty.

To fully take advantage of the growing infrastructure, we are currently in the process of totally revamping our Web site to make it more aesthetic, user-friendly, and content-rich. For our campus users, we are going to create an intranet that will eliminate much of the tedious paperwork on campus, improve intracampus communication, and will make crucial and time sensitive information more easily accessible to the College's clientele. Other projects on campus include the recent hiring of an Educational Technologist and the implementation of a Web-based library automation system.

Trends in Education and Technology

From both an observational and research standpoint, we have realized over the last five years that two things will most certainly remain tenants of truth in relation to the future of Information Technology at Pikeville College: 1) the College will be constantly challenged to increase the information capacity of the network; and 2) the College will be continually challenged to find the funds to purchase the latest and most powerful resources. Working within these restrictions has been, and will remain to be, an academic juggling act that knows few parallels on our campus. However, in light of current and potential trends that will forever alter technology and education, the need for establishing the *Handbook* stands to provide a springboard for future planning and decision-making.

In a recent article in *Yahoo! Internet Life* entitled "America's 100 Most Wired Colleges 2000" the author begins his discussion with the statement: "It used to be that U.S. colleges and universities could attract the nation's best and brightest with a prestigious name or a winning football team. But that was then. This is now: Undergraduates are as interested in a college's Net resources as in its

curriculum or social life" (Bernstein, 114). This statement testifies to a radical change in what higher educators have conventionally held as static truths. The catalyst behind this change is very clearly the computer industry. For an excellent analogy, consider this: Fifteen years ago, a Cadillac cost $17,000, achieved 12 miles to the gallon, and weighed over a ton. If the automobile industry had achieved the same technology trajectory as the computer industry in those 15 years, a 2000 model Cadillac would cost only $12.63, get 5,900 miles to the gallon, and weigh 14 pounds" (Oblinger & Verville, 47).

The most visible benefits and enhancements to higher education involve its delivery. Within 25 years, at least 95% of instruction in the U.S. will be digitally enhanced (Dunn, 35). In our own era, there has been a swift, global acceptance of distance learning as a credible and effective channel for higher education institutions. As both personal and professional demands continue to increase, remote education is quickly becoming the only educational alternative for many individuals, who can take courses and/or earn advanced degrees without sacrificing wages and significant time away from the job and family. Distance learning is both a trend of the times and a necessity mandated by both geography and societal demands (Larsen). The authors of this paper are both currently taking "Internet-only" classes through Morehead State University towards completion of an MBA degree, and can attest to the convenience, practicality, and effectiveness of distance learning.

In addition to affecting HOW higher education is delivered, emerging information technologies are likely to radically change WHERE it originates. Renowned management theorist Peter Drucker has predicted that "traditional universities as we know them will become a big wasteland in the next 25 years" (Dunn, 35). Further, by 2025, as many as half of today's existing independent colleges will "be closed, merged, or significantly altered in mission" (37). Thus, it is imperative that Pikeville College, despite being a private institution with limited financial resources, finds ways to continue investing heavily in technology, and effectively manage the implementation thereof, to ensure viability in the potentially tumultuous decades ahead.

In summary, the future promises an exciting synergy of education and technology that will find the educational process revolving largely around the computer, permitting a degree of individualization that was in the past available only to the rich. All students will have access to a curriculum tailored to their needs, learning style, pace, and profile of mastery (Gardner). Pikeville College, whose century-old mission of providing a high-quality education for the geographically and financially disadvantaged, now seeks to update its mission for the new millennium in the context of a volatile but exciting technological climate. We believe that the *Handbook* will play a large role in seeing that goal come to life.

The Making of a Handbook

The Instructional Resources Committee initiated the creation of the *Handbook* over a year ago. With only a basic "Use and Abuse" policy in place, this committee – composed of faculty, staff, and students from both the undergraduate and medical schools – saw a real need to develop a more detailed comprehensive document to support the technological aspects of the campus community. The Committee decided that the best vehicle for completion of this task would involve appointing a *Handbook* Subcommittee comprised of individuals representing groups with both knowledge about and interest in the issues in question. In February 1999, representatives from the Office of Information Technology, the Allara Library, the School of Osteopathic

Medicine, and the Dean's Office, as well as undergraduate faculty members were appointed to the *Handbook* Subcommittee to ensure that the campus' different technological visions and needs would be fairly addressed. Additionally, it was decided that although student representation would not exist on the Subcommittee, student representatives would play an active role in reviewing the document.

The *Handbook* Subcommittee, chaired by Jim Workman, Director of Information Technology (one of the two authors of this paper), first met in April 1999 and discussed the basic outline of the document, as well as allocating sections of that framework among Subcommittee members. The discussion of policies in general and the current "Use and Abuse Policy" document quickly led into the unanimous agreement that the College desperately needed a full-time Webmaster. It was also decided that the College's Coordinator of Publications, who at the time also handled the duties of Webmaster in his capacity in the Office of Public Affairs, should also play an important role in the creation of the *Handbook*. He, Dwayne Stevens (the other author of this paper) was added to the Subcommittee and attended the May 1999 meeting. The Subcommittee experienced limited time to work on the *Handbook* in June and decided that through the months of July and August they would meet once a week.

In the June 1999 meeting, a bold motion that would ultimately enhance Pikeville College's presence on the Information Highway was made. In addition to producing the *Handbook*, the Subcommittee decided to recommend to the Instructional Resources Committee that a full-time Webmaster position be created to uphold the policies and procedures in the new *Handbook*. The holder of this title would also ensure that Pikeville College would have the resources to compete with other private four-year institutions that have directed a lot of recruitment and development energies toward the Web. In addition to being recommended to the Instructional Resources Committee, the Subcommittee would also voice its opinion to the Dean and President of the College. This vision became reality in January 2000, when Dwayne Stevens assumed the Webmaster position on a full-time basis.

At the July 1, 1999 meeting, each Subcommittee member was presented with the first draft of the *Handbook*, for the first time offering tangible representation of the many hours of research and thought that had been committed to this extensive project. After discussion, many additional hours of laborious research, and several stages of revisions, version 1.0 of the *Information Technology Policies and Procedures Handbook* was submitted to the Instructional Resources Committee at their October 1999 meeting.

Version 1.0 consisted of seven sections and three appendices:

- **Section 1: Introduction** – This section provides general information about the College's technology-related facilities, staff, and other resources, as well as some general policies relating to them.
- **Section 2: Use, Abuse, and Access Policies** – This section deals with rights and responsibilities of users; acquiring and maintaining user accounts; the obligations and authority of Systems Administrators; what is considered abuse; and existing legal context and enforcement.
- **Section 3: Voice Communications Policies** – Section 3 deals with student, faculty, and staff telephone and voice mail policies. This section will be significantly expanded in the next iteration of the *Handbook* upon implementation of a new campus phone system.

- **Section 4: Web Page Policies** – This section deals with the acceptable use and content, as well as the responsibility associated with, official and unofficial Pikeville College Web pages hosted on various servers. This section will also adhere to the College's *Visual Identity Guidelines*, published by the Office of Public Affairs.
- **Section 5: Copyright Policy** – This section houses the College's Copyright Statement.
- **Section 6: Online Course Development Policies** – Section 6 specifies a framework for creating, protecting, and utilizing content for Web-enhanced or Web-based courses taught at Pikeville College.
- **Section 7: Supported Software** – This section lists what software is currently supported by PCIT on the Pikeville College campus.
- **Appendix I: Fair Use Guidelines for Educational Multimedia**
- **Appendix II: Glossary**
- **Appendix III: PCIT Forms**

Ultimately the end product of the *Handbook* Subcommittee's efforts would be reviewed and approved by the Instructional Resources Committee and then sent on to the Executive Staff for initial approval. The Instructional Resources Committee meticulously reviewed the *Handbook* from November 1999 through March 2000. The content went through several evolutions to reflect a consistent, thorough analysis of Pikeville College's current and future technological needs. Upon approval by the Instructional Resources Committee, the *Handbook* was submitted to the Executive Staff, who in turn handed it over to the College's lawyers for review. Upon initial approval of the *Handbook* by the lawyers it was returned to the Executive Staff for final approval.

Implementation

Although getting the *Handbook* approved was in itself a monumental task, perhaps the most daunting task of all will be fully integrating it into the daily operations of Pikeville College. Once a document of this scope and importance is created, the next step is to put the information into formats that make it widely accessible to the many constituents of the College. Due to the large amount of information contained within, we have devised several different avenues through which we will channel the information to its intended audiences. Currently, we plan to distribute the contents of the *Information Technology Policies and Procedures Handbook* both in print and electronically in several formats.

Due to the relatively high cost and the potentially overwhelming nature of the full printed *Handbook*, we will only be distributing this 60+ page "hard copy" to Executive Staff, divisional secretaries, and other select recipients. Students will be able to obtain a copy by request. A copy of the document will also be available in the Office of Information Technology and the Allara Library. We will be working with the Office of Public Affairs to produce a series of more cost-effective brochures for mass distribution to students, faculty, and staff, that summarize some of the major rules, regulations, legalities, procedures, and contact information contained within the *Handbook*. These brochures will be available in administrative offices, public access computer labs, and the Allara Library.

The *Handbook* will also be available in one of two electronic formats. It will assume a rather prominent role on both the College's Internet and intranet Web sites, and will be available in Adobe Acrobat® (PDF) format for viewing, printing, or download. There are many advantages, both obvious and subtle, to publishing the *Handbook* to the Web:

- Publishing to the Web will virtually eliminate conventional temporal inadequacies in dissemination, inasmuch as it will be accessible twenty-four hours a day, seven days a week.
- The online version of the *Handbook* will be hyperlinked to allow users to easily navigate between sections and to both internal and external references.
- The online version can remain dynamic in terms of content. We will monthly verify the timeliness and accuracy of existing information, and make changes where needed. The printed version of the *Handbook* will be updated annually using the current information found in the online version.
- Publishing to the Web will assist admissions counselors in easily answering questions that prospective students and/or their parents may have about technology at Pikeville College.
- Users can easily produce a hard copy of the *Handbook* for offline review by printing the PDF file, if desired.

Finally, to supplement the printed and online resources, we plan to offer various training and enrichment opportunities for faculty, staff, and students. Faculty and staff will be briefed on the new *Handbook* by periodic e-mail notices, Faculty/Staff Workshop sessions, and one-on-one interaction, when appropriate. Likewise, students will be informed of the availability of the online *Handbook* and brochures by e-mail. Additionally, all incoming students (freshmen and transfers) are required to go through an orientation process. We will work with the Office of Student Services to integrate an "Introduction to the *Information Technology Handbook*" into the series of informative topics which comprise the orientation process.

In conclusion, a handbook is only an effective vehicle of experience transfer if several enabling features are in place. If these policies and procedures are to easily move across organizational boundaries, there needs to be content simplicity, handbook availability, increased awareness of user motivation, and minimum document volume and bureaucracy (Aase). We have strived to meet these conditions through our planned implementation of the *Handbook*.

Conclusion

In this section, we had planned to discuss "What we would have changed if we could do it all over again." To be perfectly honest, we have been very satisfied with the process as a whole. We feel that the careful planning coupled with the relatively large number of people that were involved in the process helped to circumvent the problems that typically plague handbook creation and approval processes. However, we do recommend that the actual working group stay relatively small and that each person has a definite interest in the subject matter. In the end the *Handbook* Subcommittee, which was comprised of six individuals, kept their focus and achieved the goal that was put before them.

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Presenter's Index

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